Articles on anthropological subjects

Charles Rau, Jacob Baegert,
Flóris Rómer, Smithsonian Institution

ARTICLES

ON

ANTHROPOLOGICAL SUBJECTS,

CONTRIBUTED TO THE

ANNUAL REPORTS OF THE SMITHSONIAN INSTITUTION

FROM 1863 TO 1877

BY

CHARLES RAU.

WASHINGTON:
PUBLISHED BY THE SMITHSONIAN INSTITUTION.
1882.

ARTICLES

ON

ANTHROPOLOGICAL SUBJECTS,

CONTRIBUTED TO THE

ANNUAL REPORTS OF THE SMITHSONIAN INSTITUTION

FROM 1863 TO 1877

BY

CHARLES RAU.

WASHINGTON:
PUBLISHED BY THE SMITHSONIAN INSTITUTION.
1882.

JUDD & DETWEILER, PRINTERS,
WASHINGTON, D. C.

CONTENTS.

PREFACE.

The earlier articles contained in this volume appeared many years ago, when my sources of information were more limited than at present. Some statements, therefore, would be omitted, if these articles were to be written again; while, on the other hand, the results of later experience might be added. The present collection, however, is printed from the electrotyped plates of the Annual Smithsonian Reports, and the only corrections which could be made are of a typographical character.* In order to remedy, in some degree at least, the imperfections alluded to, I avail myself of this opportunity for indicating such changes and additions as seem to me most needed.

Pages 43 *and* 89.—In speaking of the use of native copper among the aborigines of North America, I stated that it was chiefly employed as a material for ornaments. This view was formerly held, but may no longer be tenable, considering that of late years many copper implements have been found in different parts of this country, more especially in the State of Wisconsin, which borders on the copper region of the North. The archæological collection of the United States National Museum comprises now seventy-four copper objects, forty-six of which are implements, the remainder consisting of ornaments, each string of beads being considered as a specimen. It would be interesting to know the whole number of prehistoric copper implements and ornaments preserved in the collections of the United States, in order to find out the true proportion.

Page 60.—Concerning the bronze tube mentioned in the note, Mr. John Evans observes as follows:—

"In the Klemm collection, formerly at Dresden, is a bronze tube, five inches long and three-quarters of an inch in diameter, found near Camenz, in Saxony, which its late owner regarded as one of the boring tools used in the manufacture of stone axes. This is now in the British Museum, and does not appear to me to have been employed for any such purpose."—*The Ancient Stone Implements, Weapons, and Ornaments of Great Britain, p. 45.*

* The necessity of preserving the plates in their original condition will also account for some want of uniformity in the appearance of the articles, which should be considered as special impressions brought into book-form as well as circumstances permitted.

Page 63.—I figure on this page a partly perforated ceremonial weapon, formerly belonging to Dr. E. H. Davis, but now in my possession. Curiously enough, not one of the five or six implements of similar shape which I had seen at the time was drilled entirely through, but only to a certain depth. Hence I concluded that in these specimens the bore had been intentionally left in that state, the handle being driven as far as possible into the cylindrical cavity, and probably more firmly attached to the blade by ligatures. Of course, I have changed my opinion long ago, and consider partly drilled objects of this character as unfinished.

Page 64.—The "mound-pipes," obtained by Messrs. Squier and Davis during their survey of earth-works in Ohio, are *not* chiefly made of porphyry. The error originated with the authors of "Ancient Monuments of the Mississippi Valley," who refer in several places of their work to porphyry as the material from which the pipes in question are mostly carved. I have thus corrected this erroneous statement in my essay on ancient aboriginal trade in North America:—"It was formerly believed most of these pipes were composed of a kind of porphyry; but since their transfer to the Blackmore Museum, they were carefully examined and partly analyzed by Professor A. H. Church, who found them to consist of softer materials." (Page 130 of this publication. I also quote there Mr. E. T. Stevens's work, "Flint Chips," which contains Professor Church's observations).

Page 77.—The ancestor of Professor C. F. P. von Martius represents one of the characters in Sir Walter Scott's "Quentin Durward," playing in that novel the part of an astrologer at the court of Louis XI of France, and is thus introduced by the Scottish romancer:—

"Louis therefore led the way, followed by the impatient Quentin, to a separate tower of the Castle of Plessis, in which was installed, in no small ease and splendor, the celebrated astrologer, poet, and philosopher, Galeotti Marti, or Martius, or Martivalle, a native of Narni, in Italy, the author of the famous treatise, *De Vulgo Incognitis*, and the subject of his age's admiration, and of the panegyrics of Paulus Jovius. He had long flourished at the court of the celebrated Matthias Corvinus, King of Hungary, from whom he was in some measure decoyed by Louis, who grudged the Hungarian monarch the society and the counsels of a sage, accounted so skillful in reading the decrees of heaven.

"Martivalle was none of those ascetic, withered, pale professors of mystic learning of those days, who bleared their eyes over the midnight furnace, and macerated their bodies by outwatching the polar bear. He indulged in all courtly pleasures, and, until he grew corpulent, had excelled in all martial sports and gymnastic exercises, as well as in the use of arms; insomuch that Janus Pannonius has left a Latin epigram, upon a wrestling match betwixt Galeotti and a renowned champion of that art, in the presence of the Hungarian king and court, in which the astrologer was completely victorious."

Elsewhere the novelist states in a note that the astrologer died in the service of Louis XI.

Page 92.—Reference is made to a *cast* copper axe, ploughed up near Auburn, Cayuga County, New York, and first described and figured by Mr. Squier, on page 78 of his "Aboriginal Monuments of the State of New York" (Washington, 1849). Several years ago, while in conversation with Mr. Squier, at his residence in New York, I happened to see the same axe lying on the mantel-piece. In handling the object, I noticed that a small portion had been removed from it—for close examination by an expert, as Mr. Squier informed me. This examination resulted in the discovery that the axe was not cast, but hammered into shape from native copper. The former inhabitants of North America, I still believe,—notwithstanding all assertions to the contrary—were unacquainted with the art of melting copper.

Page 96.—Since my statements regarding obsidian were made, the occurrence of that mineral in geological formations in Washington, Oregon, California, Idaho, Montana, Wyoming, and New Mexico, has been ascertained by the surveys conducted under the auspices of the United States Government. In some localities it is found in immense masses. I will only allude to the extensive deposits of obsidian in the Yellowstone National Park, which were examined by Mr. W. H. Holmes, and described by him in the "American Naturalist" (April, 1879, page 247). He found there some leaf-shaped implements of obsidian and a large number of obsidian flakes and chips.

Page 101.—In the meantime ancient mica mines, in the shape of open excavations, have been discovered. There are several of these diggings in Mitchell County, North Carolina, and a dozen or more are known to exist in Macon County, in the same state. See "Ancient Mica Mines in North Carolina" by C. D. Smith, in the Smithsonian Report for 1876, page 441.

Page 103.—Later experience has taught me that the number of drilled ceremonial weapons is much larger than I formerly believed.

Page 104.—Ten years have now passed by since I composed my essay on ancient aboriginal trade in North America, a short section of which treats of slate, more especially the striped or banded variety, out of which so many pierced tablets, boat and bird-shaped objects, drilled ceremonial weapons, tubes, etc., are made. I was aware at the time that the field of

their distribution reaches from the Atlantic Coast to the State of Missouri; but my efforts to learn where the peculiar material composing them occurs were fruitless. Having applied to the Smithsonian Institution for information, I was referred to a gentleman in the State of New York, who, it was said, could enlighten me on the subject. I wrote to the gentleman (now dead), and learned from him that the slate "appears as the oldest sedimentary formation in quite considerable masses along the Atlantic Coast, and has been observed from Rhode Island to Canada." Subsequent inquiries, however, led me to doubt the correctness of the information, at least with regard to the banded variety of slate. Moreover, I had occasion to see water-worn pebbles of that material, found in Ohio, where objects made of it seem to be more abundant than in any other part of the United States. These pebbles, I was further informed, are quite frequent in Ohio, and, according to Dr. H. H. Hill, of Cincinnati, it would not require much time to find a piece of the size and shape desired for any particular implement or ornament. A brief but graphic notice regarding banded slate was published by Colonel Charles Whittlesey in the "Final Report of the Ohio State Board of Centennial Managers to the General Assembly of the State of Ohio" (Columbus, 1877). He says on page 122:—

"This variegated slate is not known in Ohio, except among the drift gravel. It constitutes large masses on Lake Superior and the waters of Green Bay, where it is known, geologically, as the silicious metamorphic slate of the Huronian and Laurentian series. This is the source of the pieces found in our gravel, transported from the North during the ice period."

There are in the collection of the National Museum objects of banded slate from Massachusetts, Connecticut, New York, Pennsylvania, Ohio, Indiana, Kentucky, Illinois, Iowa, Louisiana, Michigan, and Wisconsin. I have myself a specimen from Missouri, shaped like a very small double axe, with vertical, slightly grooved edges. It cannot be supposed that the occurrence of pebbles of the banded slate is co-extensive with the area occupied by these states, and hence I probably was not wrong in regarding the material as one which formed a valued article of traffic among the ancient occupants of this country.

Page 113.—I have become somewhat doubtful as to the occurrence of *fossil* shells in the mounds of the United States; but, notwithstanding my endeavors to arrive at the truth, I am not yet prepared for a positive contradiction of my statement.

Page 114.—Allusion is made in a note to flat shell beads, found in the

grotto of Aurignac (Haute-Garonne), "which served as a burial-place at a period when the cave-bear, cave-hyena, mammoth, rhinoceros, etc., still existed." This was then the opinion of prominent European archæologists. In the meantime, however, M. Émile Cartailhac had carefully examined the Aurignac grotto, and an account of his investigation appeared in "Matériaux pour l'Histoire Primitive et Naturelle de l'Homme" (Vol. VII, p. 207). According to his view, the skeletons found in the grotto belong to a much later period than the layer inclosing the bones of extinct animals and objects of human workmanship, which covered the floor of the grotto, and extended in front of it. M. Cartailhac's reasons for referring the human remains found in the grotto to neolithic times appear very plausible.

Page 119.—The statement that "Loskiel never visited America" is incorrect, though his work to which I refer was compiled in Europe from August Gottlieb Spangenberg's and David Zeisberger's reports, and printed at Barby (Prussian Saxony) in 1789, thirteen years before the author crossed the Atlantic Ocean. He came to the United States in 1802, was superintendent of the Moravian churches and pastor at Bethlehem, Pennsylvania, where he died in 1814. The error was pointed out to me by Mr. Isaac Smucker, of Newark, Ohio.

Page 127.—Mr. Caleb Lyon's account of arrow-head-making by a Shasta Indian thus far stands alone, not having been confirmed by later observers.

On the other hand, the Indian method of manufacturing flint or obsidian arrow-heads, etc., *by pressure* with a horn or bone tool, has of late years repeatedly been witnessed and described. Major J. W. Powell, who is well acquainted with many western tribes, describes on pages 27 and 28 of his "Report of Explorations in 1873 of the Colorado of the West and its Tributaries" (Washington, 1874) the fabrication of such articles as follows:

"The obsidian or other stone of which the implement is to be made is first selected by breaking up larger masses of the rock, and choosing those which exhibit the fracture desired, and which are free of flaws; then these pieces are baked or steamed, perhaps I might say annealed, by placing them in damp earth covered with a brisk fire for twenty-four hours; then, with sharp blows, they are still further broken into flakes approximating the shape and size desired. For the more complete fashioning of the implement, a tool of horn, usually of the mountain sheep, but sometimes of the deer or antelope, is used. The flake of stone is held in one hand, placed on a little cushion made of untanned skin of some animal, to protect the hand from the flakes which are to be chipped off; and, with a sudden pressure of the bone tool, the proper shape is given. They acquire great skill in this, and the art seems to be confined to but few persons, who exchange their manufactures for other articles."

Major Powell, I may add, informed me that he saw the *Shasta* Indians making obsidian arrow-heads in exactly the same manner.

Mr. Paul Schumacher found the same method in vogue among the Indians near Klamath River, and has described it in an illustrated article (*Die Erzeugung der Steinwaffen*) in the "Archiv für Anthropologie" (Vol. VII, 1875, page 263). He also gives a short account of the operation in the Smithsonian Report for 1873 (page 355), which appeared after the publication of his German article. Mr. Stephen Powers repeatedly calls attention to the practice of this method in his work entitled "Tribes of California" (Vol. III of Contributions to North American Ethnology, Washington, 1877). A very complete corroborative statement, finally, was published in the "American Naturalist" (November, 1879, page 667). The author, Mr. B. B. Redding, witnessed in Northern California the fabrication of a fine obsidian arrow-head by Consolulu, an aged ex-chief of the Wintoons. The process is described in all its details.

Figure 340 on page 95 of my Smithsonian publication, "The Archæological Collection of the United States National Museum" (Washington, 1876), represents, in one-fifth of the natural size, one of the chipping tools of the collection, and in a note on page 22 of the same work I allude to the mode of application of such implements.

These are regarded as the most important emendations which should receive the attention of the reader, before he enters upon a perusal of the following treatises.

CHARLES RAU.

SMITHSONIAN INSTITUTION,
WASHINGTON, D. C., *February*, 1882.

ARTICLES

ON

ANTHROPOLOGICAL SUBJECTS.

AN ACCOUNT

OF

THE ABORIGINAL INHABITANTS

OF

THE CALIFORNIAN PENINSULA,

AS GIVEN BY

JACOB BAEGERT, A GERMAN JESUIT MISSIONARY, WHO LIVED THERE SEVENTEEN YEARS DURING THE SECOND HALF OF THE LAST CENTURY.

TRANSLATED AND ARRANGED FOR THE SMITHSONIAN INSTITUTION BY CHARLES RAU, OF NEW YORK CITY.

INTRODUCTION.

WHEN, in 1767, by a decree of Charles III, all members of the order of the Jesuits were banished from Spain and the transatlantic provinces subject to that realm, those Jesuits who superintended the missions established by the Spaniards since 1697 in Lower California were compelled to leave their Indian converts, and to transfer their spiritual authority to a number of friars of the Franciscan order. One of the banished Jesuits, a German, who had spent seventeen years in the Californian peninsula, published, after his return to his native country, a book which contains a description of that remote part of the American continent, and gives also quite a detailed account of its aboriginal inhabitants, with whom the author had become thoroughly acquainted during the many years devoted to their conversion to Christianity. This book, which is now very scarce in Germany, and, of course, still more so in this country, bears the title: *Account of the American Peninsula of California; with a twofold Appendix of False Reports. Written by a Priest of the Society of Jesus, who lived there many years past. Published with the Permission of my Superiors. Mannheim*, 1773.*

Modesty, or perhaps other motives, induced the author to remain anonymous, but with little success; for his name, which was *Jacob Baegert*, is sometimes met with in old catalogues, in connexion with the title of his book. That his home was on the Upper Rhine, he states himself in the text, but further particulars relative to his private affairs, before or after his missionary labors in California, have not come to my knowledge. He does not even mention over which of the fifteen missions existing at his time on the peninsula he presided, but merely says that he had lived in California under the twenty-fifth degree, and twelve leagues distant from the Pacific coast, opposite the little bay of St. Magdalen. On the map accompanying his work there are two missionary stations marked under that latitude—the mission of St. Aloysius and that of the

---

* Nachrichten von der Amerikanischen Halbinsel Californien: mit einem zweyfachen Anhang Falscher Nachrichten. Geschrieben von einem Priester der Gesellschaft Jesu, welcher lang darinn diese letztere Jahr gelebet hat. Mit Erlaubnuss der Oberen. Mannheim, 1773.

Seven Dolors, (Septem Dolorum,) of which the first named evidently was his place of residence.

The work in question constitutes a small octavo volume of 358 pages, and is divided into three parts. The first division (of which I will give a short synopsis in this introduction) treats of the topography, physical geography, geology, and natural history of the peninsula; the second part gives an account of the *inhabitants*, and the third embraces a short but interesting history of the missions in Lower California. In the appendices to the work the author refutes certain exaggerated reports that had been published concerning the Californian peninsula, and he is particularly very severe upon *Venegas'* "Noticia de la California," (Madrid, 1757, 3 vols.,) a work which is also translated into the English, French, and German languages. He accuses the Spanish author of having given by far too favorable, and, in many instances, utterly false accounts of the country, its productions and inhabitants, which is rather a noticeable circumstance, since *Venegas* is considered as an authority in matters relating to the ethnology of California.

While reading the work of the German missionary, I was struck with the amount of ethnological information contained in it, especially in the second part, which is exclusively devoted to the aboriginal inhabitants, as stated before; and upon conversing on the subject with some friends, members of the American Ethnological Society, they advised me to translate for publication if not the whole book, at least that part of it which relates to the native population, of which we know, comparatively, perhaps less than of any other portion of the indigenous race of North America. As there is a growing taste for the study of ethnology manifested in this country, and, consequently, a tendency prevailing to collect all materials illustrating the former condition of the American aborigines in different parts of the continent, I complied with the request of my friends, and devoted my hours of leisure to the preparation of this little work, supposing that the account of a man who lived among those Californians a century ago, when their original state had been but little changed by intercourse with Europeans, might be an acceptable addition to our stock of ethnological knowledge.

I have to state, however, that the following pages are not a translation in the strict sense of the word, but a reproduction of the work only as far as it refers to ethnological matters. The reasons which induced me thus to deviate from the usual course of a translator are obvious; for even that portion of the text which treats of the native race contains many things that are not in the least connected with ethnology, the good father being somewhat garrulous and rather fond of moralizing and enlarging upon religious matters, as might be expected from one of his calling; and, although he places the natives of the peninsula exceedingly low in the scale of human development, he takes, nevertheless, occasion to draw comparisons between their barbaric simplicity and the over-refined habits of the Europeans, much in the manner of Tacitus, who seizes upon every opportunity to rebuke the luxury and extravagance of his countrymen, while he describes the rude sylvan life of the ancient inhabitants of Germany. My object being simply to rescue from oblivion a number of facts relating to a portion of the American race, I have omitted all superfluous commentaries indulged in by the author, and, in order to bring kindred subjects under common heads, I have now and then used some freedom in the arrangement of the matter, which is not always properly linked in the original. Although the second part of the book has chiefly furnished the material for this reproduction, I have transferred to the English text, and inserted in the proper places, all those passages in the other divisions, and even in the two appendices that have a bearing upon ethnology, giving thus unity and completeness to the subject, which induced me to prepare these pages. For the rest I have preserved, so far as feasible, the language of the author. Not

much can be said, however, in favor of the style exhibited in the original, and even the spelling of the words defies all rules of orthography, which were adopted a century ago in the German language; nor is our father unaware of his deficiencies, but honestly states in his preface that "if his style was none of the smoothest, and his orthography incorrect in some places, the reader might consider that during the seventeen years of his sojourn in California, comprising the period from 1751 to 1768, he hardly ever had conversed in German, and, consequently, almost forgotten the use of his mother language."

Of the peninsula Father Baegert gives a rather woeful account. He describes that region as an arid, mountainous country, covered with rocks and sand, deficient in water, and almost without shade-trees, but abounding in thorny plants and shrubs of various kinds. The sterility of the soil is caused by the scantiness of water. "No one," says the author, "need be afraid to drown himself in water; but the danger of dying from thirst is much greater." There falls some rain, accompanied by short thunder-storms, during the months of July, August, September, and October, filling the channels worn in the hard ground. Some of these soon become dry after the showers; others, however, hold water during the whole year, and on these and the stagnant water collected in pools and ponds men and beasts have to rely for drink. Of running waters, deserving the name of brooks, there are but six in the country, and of these six only four reach the sea, while the others lose themselves not very far from their sources among rocks and sand. There is nothing to be seen in Lower California that may be called a wood; only a few straggling oaks, pines, and some other kinds of trees unknown in Europe, are met with, and these are confined to certain localities. Shade and material for the carpenter are, therefore, very scarce. The only tree of any consequence is the so-called mesquite; but besides that it always grows quite isolated, and never in groups, the trunk is very low, and the wood so hard that it almost defies the application of iron tools. The author mentions, further, a kind of low Brazil wood, a tree called paloblanco, the bark of which serves for tanning; the palohierro or iron-wood, which is still harder than the mesquite; wild fig trees that bear no fruit; wild willows and barren palms, "all of which would be ashamed to appear beside a European oak or nut-tree." One little tree yields an odoriferous gum that was used in the Californian churches as frankincense. But in compensation for the absence of large trees, there is a prodigious abundance of prickly plants, some of a gigantic height, but of little practical use, their soft, spongy stems soon rotting after being cut. Among the indigenous edible productions of the vegetable kingdom are chiefly mentioned the tunas or Indian figs, the aloë, and the pitahayas, of which the latter deserve a special notice as forming an important article of food of the Indians. There are two kinds of this fruit—the sweet and the sour pitahaya. The former is round, as large as a hen's egg, and has a green, thick, prickly shell that covers a red or white flesh, in which the black seeds are scattered like grains of powder. It is described as being sweet, but not of a very agreeable taste without the addition of lemon juice and sugar. There is no scarcity of shrubs bearing this fruit, and from some it can be gathered by hundreds. They become mature in the middle of June, and continue for more than eight weeks. The sour pitahaya, which grows on low, creeping bushes, bristling with long spines, is much larger than the other kind, of excellent taste, but by far less abundant; for, although the shrubs are very plentiful, there is hardly one among a hundred that bears fruit. Of the aloë or mescale, as the Spaniards and Mexicans call it, the fibres are used by the aborigines, in lieu of hemp, for making threads and strings, and its fruit is eaten by them.

A very curious portion of the book is that which treats of the animals found in California. The author is evidently not much of a naturalist, and, in classifying animals, he manifests occasionally a sovereign independence that would

shock the feelings of a Blumenbach or Agassiz; yet his remarks, resulting from actual observation, are for the most part correct, and evince undeniably his love of truth. In the list of wild quadrupeds are enumerated the deer, hare, rabbit, fox, coyote, wild cat, skunk, (Sorillo,) leopard, (American panther,) onza, and wild ram. In reference to the last-named animal the author remarks: "Where the chain of mountains that runs lengthwise through the whole peninsula reaches a considerable height, there are found animals resembling our rams in all respects, except the horns, which are thicker, longer, and much more curved. When pursued, these animals will drop themselves from the highest precipices upon their horns without receiving any injury. Their number, however, cannot be great, for I never saw a living specimen, nor the fur of one in the possession of an Indian; but many skins of leopards and onzas."

This animal is doubtless identical with the Rocky Mountain sheep, *(Ovis montana.)*

The feathered tribe does not seem to be very plentiful in California, since, according to Father Baegert, a person may travel one or two days without seeing other birds but occasionally a filthy vulture, raven, or "bat." Among the few which he observed are the red-bird, *(cardinal)* blue-bird, humming-bird, and an "ash-colored bird with a tail resembling that of a peacock and a beautiful tuft on its head;" also wild ducks and a species of swallow, the latter appearing only now and then in small numbers, and therefore considered as extraneous.

There are some small fish found in the waters of California; but they do not amount to much, and during lent the father obtained his supply from the Pacific, distant 12 leagues from his habitation. On the other days of abstinence his meal usually consisted of a "little goat-milk and dry beans, and if a few eggs were added, he cared for nothing else, but considered himself well entertained."

Under the comprehensive, but not very scientific head of "vermin," the author enumerates snakes, scorpions, centipedes, huge spiders, toads, wasps, bats, ants, and grasshoppers. These vermin seem to have been a great annoyance to the good missionary, especially the snakes, of which there are about twenty different kinds in California, the rattlesnake being, of course, the most conspicuous among them. This dangerous reptile, which seems to be very numerous in that region, is minutely and correctly described, and, as might be expected, there are also some "snake stories" related. One day when the author was about to shave and took his razors from the upper board of his book-shelf, he discovered there, to his horror, a rattlesnake of large size. He received likewise in his new dwelling-house, which was a stone building, frequent visits from scorpions, large centipedes, tarantulas, ants and toads, all precautions being unavailing against the intrusion of these uninvited guests. The grasshoppers are represented as a real public calamity. Migrating from the southern part of the peninsula towards the north, they deluge the country, obscuring the sun by their numbers, and causing a noise that resembles a strong wind. Never deviating from their line of march, they will climb houses and churches encountered during their progress, laying waste all fields and gardens over which their pernicious train passes.

Of the climate in California the author speaks well, and considers it as both healthy and agreeable. Being only one degree and a half distant from the Tropic of Cancer, he lived, of course, in a hot region, and he remarks with reference to the high temperature that some thought the name "California" was a contraction from the Latin words *calida fornax*, (hot oven,) without vouching, however, for the correctness of the derivation, though he is certain that the appellation is not of Indian origin. The greatest heat begins in the month of July and lasts till the middle of October; but there is every day in the year quite a refreshing wind blowing, which begins at noon, if not sooner, and continues till night. The principal winds are north west and south west; the north

wind blows only now and then during the winter months, but the east wind hardly ever, the latter circumstance being somewhat surprising to the author, who observed that the clouds are almost invariably moving from the east. He never found the cold severer than during the latter part of September or April on the banks of the Rhine, where, after his return, the persevering coldness of winter and clouded atmosphere during that period made him long for the mild temperature and always blue and serene sky of the country he had left. Fogs in the morning are frequent in California, and occur not only during fall and winter, but also sometimes in the hot season. Dew is said to be not more frequent nor heavier than in middle Europe.

Though the author represents California as a dry, sterile country, where but little rain falls, he admits that in those isolated parts where the proximity of water imparts humidity, the soil exhibits an astonishing fertility. "There," he says, "one may plant what he chooses, and it will thrive; there the earth yields fruit a hundred-fold, as in the best countries of Europe, producing wheat and maize, rice, pumpkins, water and other melons of twenty pounds' weight, cotton, lemons, oranges, plantains, pomegranates, excellent sweet grapes, olives and figs, of which the latter can be gathered twice in a summer. The same field yields a double or threefold harvest of maize, that grows to prodigious height, and bears sometimes twelve ears on one stalk. I have seen vines in California that produced in the second year a medium sized basket full of grapes; in the third or fourth year some are as thick as an arm, and shoot forth, in one season, eight and more branches of six feet length. It is only to be regretted that such humid places are of very rare occurrence, and that water for irrigating a certain piece of land sometimes cannot be found within a distance of sixty leagues."

In the last chapter of the first part the author gives an account of the pearl fisheries and silver mines carried on in Lower California while he was there. Both kinds of enterprise are represented as insignificant and by no means very profitable. "Every summer," he says, "eight, ten or twelve poor Spaniards from Sonora, Cinaloa or other parts opposite the peninsula, cross the Gulf in little boats, and encamp on the California shore for the purpose of obtaining pearls. They carry with them a supply of Indian corn and some hundred weight of dried beef, and are accompanied by a number of Mexican Indians, who serve as pearl fishers, for the Californians themselves have hitherto shown no inclination to risk their lives for a few yards of cloth. The pearl fishers are let down into the sea by ropes, being provided with a bag for receiving the pearl oysters which they rake from the rocks and the bottom, and when they can no longer hold their breath, they are pulled up again with their treasure. The oysters, without being opened, are counted, and every fifth one is put aside for the king. Most of them are empty; some contain black, others white pearls, the latter being usually small and ill-shaped. If a Spaniard, after six or eight weeks of hard labor, and after deducting all expenses, has gained a hundred American *pesos* (that is 500 French livres, or a little more than 200 Rhenish florins—a very small sum in America!) he thinks he has made a little fortune which he cannot realize every season. God knows whether the fifth part of the pearls fished in the Californian sea yields, on an average, to the Catholic king 150 or 200 pesos in a year, even if no frauds are committed in the transaction. I heard of only two individuals, with whom I was also personally acquainted, who had accumulated some wealth, after spending twenty and more years in that line of business. The others remained poor wretches, with all their pearl fishing."

There were but two silver mines of any note in operation at the time of Baegert's sojourn in California, and those had been opened only a few years previous to his arrival. They were situated in the districts of St. Anna and St. Antonio, near the southern end of the peninsula, and only three leagues

distant from each other. Digging for silver in California is not represented as a lucrative business, the owner of one of the mines being so poor that he had to beg for his travelling money when he was about to return to Spain. The proprietor of the other mine was in better circumstances, but he owed his wealth more to other speculations than to his subterranean pursuits. The mining population in the two districts amounted to 400 souls, women and children included, and the workmen were either Spaniards born in America, or Indians from the other side of the Californian gulf. The external condition of these people is represented as wretched in the highest degree. The soil produced almost nothing, and not having the necessary money to procure provisions from the Mexican side, they were sometimes compelled to gather their food in the fields, like the native Californians. The author speaks of a locality between the twenty-eighth and twenty-ninth degree, called Rosario, where some supposed gold to exist; but even admitting the fact, he thinks it would be almost impossible to work mines in that region, where neither food for men and beasts, nor water and wood, can be procured. Near the mission of St. Ignatius (28th degree) sulphur is found, and on the islands of El Carmen and St. Joseph in the Californian gulf, and in different places on both coasts, salt of very good quality is abundant.

Having thus given an abstract of the first part of the book, I cannot conclude these introductory remarks without saying a few words in favor of the Jesuits. Whatever we may think, as Protestants, of the tendencies of that order, we cannot but admit that those of its members who came as missionaries to America deserve great credit for their zeal in propagating a knowledge of the countries and nations they visited in the New World. To the student of American ethnology particularly, the numerous writings of the Jesuit fathers are of inestimable value, forming, as it were, the very foundations upon which almost all subsequent researches in that interesting field of inquiry are based.

"The missionaries and discoverers whom the order of the Jesuits sent forth were for the most part not only possessed of the courage of martyrs, and of statesmanlike qualities, but likewise of great knowledge and learning. They were enthusiastic travellers, naturalists, and geographers; they were the best mathematicians and astronomers of their time. They have been the first to give us faithful and circumstantial accounts of the new countries and nations they visited. There are few districts in the interior of America concerning which the Jesuits have not supplied us with the oldest and best works, and we can scarcely attempt the study of any American language without meeting with a grammar composed by a Jesuit. In addition to their chapels and colleges in the wilderness, the Jesuits likewise erected observatories; and there are few rivers, lakes, and mountains in the interior, which they have not been the first to draw upon our maps."

With this well-deserved eulogy, which is quoted from Mr. J. G. Kohl's recent work on the discovery of America, I leave to Father Baegert himself the task of relating his experiences among the natives of Lower California.

AN ACCOUNT OF THE ABORIGINAL INHABITANTS OF THE CALIFORNIAN PENINSULA.

CHAPTER I.—THE STATURE, COMPLEXION, AND NUMBER OF THE CALIFORNIANS; ALSO, WHENCE AND HOW THEY MAY HAVE COME TO CALIFORNIA.

In physical appearance the Californians resemble perfectly the Mexicans and other aboriginal inhabitants of America. Their skin is of a dark chestnut or clove color, passing, however, sometimes into different shades, some individuals being of a more swarthy complexion, while others are tan or copper colored.

But in new-born children the color is much paler, so that they hardly can be distinguished from white children when presented for baptism; yet it appears soon after birth, and assumes its dark tinge in a short time. The hair is black as pitch and straight, and seldom turns gray, except sometimes in cases of extreme old age. They are all beardless, and their eye-brows are but scantily provided with hair. The heads of children at their birth, instead of being covered with scales, exhibit hair, sometimes half a finger long. The teeth, though never cleaned, are of the whiteness of ivory. The angles of the eyes towards the nose are not pointed, but arched like a bow. They are well-formed and well-proportioned people, very supple, and can lift up from the ground stones, bones, and similar things with the big and second toes. All walk, with a few exceptions, even to the most advanced age, perfectly straight. Their children stand and walk, before they are a year old, briskly on their feet. Some are tall and of a commanding appearance, others small of stature, as elsewhere, but no corpulent individuals are seen among them, which may be accounted for by their manner of living, for, being compelled to run much around, they have no chance of growing stout.

In a country as poor and sterile as California the number of inhabitants cannot be great, and nearly all would certainly die of hunger in a few days if it were as densely populated as most parts of Europe. There are, consequently, very few Californians, and, in proportion to the extent of the country, almost as few as if there were none at all; yet, nevertheless, they decrease annually. A person may travel in different parts four and more days without seeing a single human being, and I do not believe that the number of Californians from the promontory of St. Lucas to the Rio Colorado ever amounted, before the arrival of the Spaniards, to more than forty or fifty thousand souls.* It is certain that in 1767, in fifteen, that is, in all the missions, from the 22d to the 31st degree, only twelve thousand have been counted. But an insignificant population and its annual diminution are not peculiar to California alone; both are common to all America. During my journey overland along the east side of the Californian gulf, from Guadalaxara to the river Hiaqui, in the Mexican territory, a distance of four hundred leagues,† I saw only thirteen small Indian villages, and on most days I did not meet a living soul. Father Charlevoix, before setting out on a journey through Canada or New France, writes in his first letter, addressed to the Duchess of Lesdiguières, that he would have to travel sometimes a hundred and more leagues, without seeing any human beings besides his companions.‡

With the exception of Mexico and some other countries, North America was, even at the time of the discovery, almost a wilderness when compared with Germany and France; and this is still more the case at the present time. Whoever has read the history of New France, by the above-named author, or has travelled six or seven hundred leagues through Mexico, and, besides, obtained reliable information concerning the population of other provinces, can easily form an estimate of the number of native inhabitants in North America; and if the southern half of the New World does not contain a hundred times more inhabitants than the northern part, which, relying on the authority of men who have lived there many years and have travelled much in that country, I am far from believing, those European geographers who speak in their books of 300 millions of Americans are certainly mistaken. Who knows whether they

---

* Washington Irving states they had numbered from 25,000 to 30,000 souls when the first missions were established; on what authority I do not know.—*Adventures of Captain Bonneville*, (ed. of 1851,) p. 332.

† *Stunden.*—I translate this word by "league," through the French *lieue* is a little longer than the German *stunde*.

‡ Histoire de la Nouvelle France, par le P. de Charlevoix. Paris, 1744, vol. v, p. 66.

would find in all more than fifteen or twenty millions? The many hundred languages which are spoken in South America alone are a sure evidence of a scanty population, although the contrary might be inferred at first sight; for if there were more people, there would be more community among them, the tribes would live closer together, and, as a result, there would be fewer languages. The Ikas in my district speak a language different from that of the other people in my mission; but I am pretty sure that the whole nation of these Ikas never amounted to five hundred persons.

It is easy to comprehend why America is so thinly populated, the manner of living of the inhabitants and their continual wars among themselves being the causes of this deficiency; but how it comes that, since the discovery of the fourth part of the world, its population is constantly melting down, even in those provinces where the inhabitants are not subjected to the Europeans, but retain their full, unrestrained liberty, as, for instance, according to Father Charlevoix, in Louisiana, (that is, in the countries situated on both sides of the Mississippi,) is a question, the solution of which I leave to others, contenting myself with what is written in the Psalms, namely, that the increase or diminution of the human race in different countries is a mystery which man cannot penetrate.

However small the number of Californians is, they are, nevertheless, divided into a great many nations, tribes, and tongues.* If a mission contains only one thousand souls, it may easily embrace as many little nations among its parishioners as Switzerland counts cantons and allies. My mission consisted of Paurus, Atshémes, Mitshirikutamáis, Mitshirikuteurus, Mitshirikutaruanajéres, Teackwàs, Teenguábebes, Utshis, Ikas, Anjukáwres, Utshipujes; all being different tribes, but hardly amounting in all to five hundred souls.

It might be asked, in this place, why there existed fifteen missions on the peninsula, since it appears that 12,000, and even more, Indians could be conveniently superintended and taken care of by three or four priests. The answer is, that this might be feasible in Germany as well as in a hundred places out of Europe, but is utterly impracticable in California; for, if 3 or 4,000 Californians were to live together in a small district, the scanty means of subsistence afforded by that sterile country would soon prove insufficient to maintain them. Besides, all of these petty nations or tribes have their own countries, of which they are as much, and sometimes even more, enamored than other people of theirs, so that they would not consent to be transplanted fifty or more leagues from the place they consider as their home. And, further, the different tribes who live at some distance from each other are always in a mutual state of enmity, which would prevent them from living peaceably together, and offer a serious obstacle to their being enclosed in the same fold. In time of general contagious diseases, lastly, which are of no unfrequent occurrence, a single priest could not perform his duties to their full extent in visiting all his widely scattered patients, and administering to their spiritual and temporal wants. My parish counted far less than a thousand members, yet their encampments were often more than thirty leagues distant from each other. Of the languages and dialects in this country there are also not a few, and a missionary is glad if he has mastered one of them.

It remains now to state my opinion concerning the place where the Californians came from, and in what manner they effected their migration to the country they now occupy. They may have come from different localities, and either voluntarily or by some accident, or compelled by necessity; but that people

* The author probably fell into the very common error of confounding dialects with languages. Dr. Waitz, relying on Buschmann's linguistic researches, mentions only three *principal* languages spoken by the natives of Lower California, viz., the Pericu, Monqui, and Cochimi languages.—*Anthropologie der Naturvölker von Dr. Theodor Waitz.* Leipzig, 1864; vol. iv, p. 248.

should have migrated to California of their own free will, and without compulsion, I am unable to believe. America is very large, and could easily support fifty times its number of inhabitants on much better soil than that of California. How, then, is it credible that men should have pitched, from free choice, their tents amidst the inhospitable dreariness of these barren rocks? It is not impossible that the first inhabitants may have found by accident their way across the sea from the other side of the Californian gulf, where the provinces of Cinaloa and Sonora are situated; but, to my knowledge, navigation never has been practiced by the Indians of that coast, nor is it in use among them at the present time. There is, furthermore, within many leagues towards the interior of the country no kind of wood to be had suitable for the construction of even the smallest vessel. From the Pimeria, the northernmost country opposite the peninsula, a transition might have been easier either by land, after crossing the Rio Colorado, or by water, the sea being in this place very narrow and full of islands. In default of boats they could employ their balsas or little rafts made of reeds, which are also used by my Californians who live near the sea, either for catching fish or turtle, or crossing over to a certain island distant two leagues from the shore. I am, however, of opinion that, if these Pimerians ever had gone to California induced by curiosity, or had been driven to that coast by a storm, the dreary aspect of the country soon would have caused them to return without delay to their own country. It was doubtless necessity that gave the impulse to the peopling of the peninsula. Nearly all neighboring tribes of America, over whom the Europeans have no sway, are almost without cessation at war with each other, as long as one party is capable of resistance; but when the weaker is too much exhausted to carry on the feud, the vanquished usually leaves the country and settles in some other part at a sufficient distance from its foes. I am, therefore, inclined to believe that the first inhabitants, while pursued by their enemies, entered the peninsula by land from the north side, and having found there a safe retreat they remained and spread themselves out. If they had any traditions, some light might be thrown on this subject; but no Californian is acquainted with the events that occurred in the country prior to his birth, nor does he even know who his parents were if he should happen to have lost them during his infancy.

To all appearance the Californians, at least those toward the south, believed, before the arrival of the Spaniards in their country, that California constituted the whole world, and they themselves its sole inhabitants; for they went to nobody, and nobody came to see them, each little people remaining within the limits of its small district. Some of those under my care believed to be derived from a bird; some traced their origin from a rock that was lying not far from my house; while others ascribed their descent to still different, but always equally foolish and absurd sources.

CHAPTER II.—THEIR HABITATIONS, APPAREL, IMPLEMENTS, AND UTENSILS.

With the exception of the churches and dwellings of the missionaries, which every one, as well as he could, and as time and circumstances permitted, built of stone and lime, of stone and mud, of huge unburnt bricks, or other materials, and besides some barracks which the Indians attached to the missions, the few soldiers, boatmen, cowherds, and miners have now erected in the fourteen stations, nothing is to be seen in California that bears a resemblance to a city, a village, a human dwelling, a hut, or even a dog-house. The Californians themselves spend their whole life, day and night, in the open air, the sky above them forming their roof, and the hard soil the couch on which they sleep. During winter, only, when the wind blows sharp, they construct around them, but only opposite the direction of the wind, a half moon of brush-wood, a few spans high,

as a protection against the inclemency of the weather,* showing thus that, notwithstanding their simplicity, they understand pretty well "how to turn the mantle towards the wind."† It cannot be otherwise with them; for, if they had houses, they would be compelled to carry their dwellings always with them, like snails or turtles, the necessity of collecting food urging them to wander constantly about. Thus they cannot start every morning from the same place and return thither in the evening, since, notwithstanding the small number of each little people, a small tract of land could not provide them with provisions during a whole year. To-day the water will fail them; to-morrow they have to go to some locality for gathering a certain kind of seed that serves them as food, and so they fulfil to the letter what is written of all of us, namely, that we shall have no fixed abode in this world. I am certainly not much mistaken in saying that many of them change their night-quarters more than a hundred times in a year, and hardly sleep three times successively in the same place and the same part of the country, always excepting those who are connected with the missions. Wherever the night surprises them they will lie down to sleep, not minding in the least the uncleanliness of the ground, or apprehending any inconvenience from reptiles and other vermin, of which there is an abundance in this country. They do not live under the shade of trees, as some authors have said, because there are hardly any trees in California that afford shade, nor do they dwell in earth-holes of their own making, as others have said, but sometimes, and only when it rains, they resort to the clefts and cavities of rocks, if they can find such sheltering places, which do not occur as frequently as their wants require.

Whenever they undertake to construct shelters for protecting their sick from heat or cold, the entrance is usually so low that a person has to creep on hands and feet in order to get in, and the whole structure is of such small dimensions as to render it impossible to stand erect within, or to find room to sit down on the ground for the purpose of confessing or comforting the patient. Of no better condition are the huts of those Indians who live near the missions, the same being often so small and miserable that man and wife hardly can sit or lie down in them. Even the old and infirm are utterly indifferent as to their being under shelter or not, and it happened often that I found old sick persons lying in the open air, for whose accommodation I had caused huts to be built on the preceding day. So much for habit.

As the blue sky forms the only habitation of the Californian Indians, so they wear no other covering than the brown skin with which nature has clothed them. This applies to the male sex in the full sense of the word, and even women have been found in the northern parts of California in a perfect state of nudity, while among most nations the females always covered themselves to a small extent. They did, and still continue to do, as follows: They understand how to prepare from the fibres of the aloë plant a white thread, which serves them for making cords‡ On these they string hundreds of small sections of water-reed, like beads of a rosary; and a good number of these strings, attached by their ends to a girdle, and placed very close and thick together, form two aprons, one of which hangs down below the abdomen, while the other covers the hind part. These aprons are about a span wide, and of different length. Among

* Captain Bonneville gives a cheerless account of a village of the Root Diggers, which he saw in crossing the plain below Powder river. "They live," says he, "without any further protection from the inclemency of the season than a sort of break-weather, about three feet high, composed of sage, (or wormwood,) and erected around them in the shape of a half moon."—*Washington Irving: Adventures of Captain Bonneville*, p. 259.

† German proverb.

‡ It may not be out of place to mention here that in Mexico the dried fibres of the aloë or maguey plant (*Agave Americana*) are a universal substitute for hemp in the manufacture of cordage and packing-cloth.

some nations they reach down to the knees; among others to the calves, and even to the feet. Both sides of the thighs, as well as the rest of the body, remain perfectly naked. In order to save labor, some women wear, instead of the back-aprons, a piece of untanned deer-skin, or any woollen or linen rag which they can now-a-days obtain. Of the same untanned skin they make, if they can get it, their shoes or sandals, simply flat pieces, which they attach to the feet by coarse strings of the above-mentioned aloë, passing between the big and small toes and around the ankles.

Both sexes, the grown as well as the children, wear the head always uncovered, however inclement the weather may be, even those in a certain mission who understand how to manufacture pretty good hats from palm-leaves, which, on account of their lightness, were frequently worn by the missionaries while on their travels. The men allow the hair to grow down to the shoulders. Women, on the contrary, wear it much shorter. Formerly they pierced the ears of new-born children of the male sex with a pointed stick, and by putting bones and pieces of wood into the aperture they enlarged it to such a degree that, in some grown persons, the flaps hung down nearly to the shoulders. At present, however, they have abandoned this unnatural usage. It has been asserted that they also pierce the nose. I can only say that I saw no one disfigured in that particular manner, but many middle-aged persons with their ears perforated as described above. Under certain circumstances, and on their gala days, they paint different parts of their body with red and yellow color, which they obtain by burning certain minerals.

The baptized Indians, of course, observed more decency in regard to dress. The missionaries gave each male individual, once or twice in a year, a piece of blue cloth, six spans long and two spans wide, for covering the lower part of the body, and, if their means allowed it, a short woollen coat of blue color. The women and girls were provided with thick white veils, made of wool, that covered the head and the whole body down to the feet. In some missions the women received also petticoats and jackets of blue flannel or woven cotton shirts, and the men trowsers of coarse cloth and long coats. But the women throw aside their veils, and the men their coats, as soon as they leave church, because those coverings make them feel uneasy, especially in summer, and impede the free use of their limbs, which their mode of living constantly requires. I will mention here that all these goods had to be brought from the city of Mexico, since nothing of the kind can be manufactured in California for want of the necessary materials. The number of sheep that can be kept there is small, and, moreover, they lose half their wool by passing through the thorny shrubs, of which there is an astonishing abundance in this ill-favored country.

It is not to be expected that a people in as low state of development as the Californians should make use of many implements and utensils. Their whole furniture, if that expression can be applied at all, consists of a bow and arrows, a flint instead of a knife, a bone or pointed piece of wood for digging roots, a turtle-shell serving as basket and cradle, a large gut or bladder for fetching water and transporting it during their excursions, and a bag made like a fishing net from the fibres of the aloë, or the skin of a wild cat, in which they preserve and carry their provisions, sandals, and perhaps other insignificant things which they may happen to possess.

The bows of the Californians are more than six feet long, slightly curved, and made from the roots of wild willows. They are of the thickness of the five fingers in the middle, round, and become gradually thinner and pointed towards the ends. The bow-strings are made of the intestines of beasts. The shafts of their arrows consist of common reeds, which they straighten by the fire. They are above six spans long, and have, at the lower end, a notch to catch the string, and three or four feathers, about a finger long, not much projecting, and let into slits made for that purpose. At the upper end of the shaft

a pointed piece of heavy wood, a span and a half long, is inserted, bearing usually at its extremity a flint of a triangular shape, almost resembling a serpent's tongue, and indented like the edge of a saw.* The Californians carry their bows and arrows always with them, and as they commence at an early age to use these weapons many of them become very skilful archers.

In lieu of knives and scissors they use sharp flints for cutting almost everything—cane, wood, aloë, and even their hair—and for disembowelling and skinning animals. With the same flints they bleed or scarify themselves, and make incisions for extracting thorns and splinters which they have accidentally run into their limbs.

The whole art of the men consists in the manufacture of bows and arrows, while the mechanical skill of the females is merely confined to the making of the above-mentioned aprons. Of a division of labor not a trace is to be found among them; even the cooking is done by all without distinction of sex or age, every one providing for himself, and the children commence to practice that necessary art as soon as they are able to stir a fire. The time of these people is chiefly taken up by the search for food and its preparation; and if their physical wants are supplied they abandon themselves entirely to lounging, chattering, and sleep. This applies particularly to the roaming portion of the Californian Indians, for those who dwell near the missions now established in the country are sometimes put to such labor as the occasion may require.

CHAPTER III.—OF THEIR FOOD AND THE MANNER OF PREPARING IT.

Notwithstanding the barrenness of the country, a Californian hardly ever dies of hunger, except, perhaps, now and then an individual that falls sick in the wilderness and at a great distance from the mission, for those who are in good health trouble themselves very little about such patients, even if these should happen to be their husbands, wives, or other relations; and a little child that has lost its mother or both parents is also occasionally in danger of starving to death, because in some instances no one will take charge of it, the father being sometimes inhuman enough to abandon his offspring to its fate.

The food of the Californians, as will be seen, is certainly of a mean quality, yet it keeps them in a healthy condition, and they become strong and grow old in spite of their poor diet. The only period of the year during which the Californians can satisfy their appetite without restraint is the season of the pitahayas, which ripen in the middle of June and abound for more than eight weeks. The gathering of this fruit may be considered as the harvest of the native inhabitants. They can eat as much of it as they please, and with some this food agrees so well that they become corpulent during that period; and for this reason I was sometimes unable to recognize at first sight individuals, otherwise perfectly familiar to me, who visited me after having fed for three or four weeks on these pitahayas. They do not, however, preserve them, and when the season is over they are put again on short rations. Among the roots eaten by the Californians may be mentioned the yuka, which constitutes an important article of food in many parts of America, as, for instance, in the island of Cuba, but is not very abundant in California. In some provinces it is made into a kind of bread or cake, while the Californians, who would find this process too tedious, simply roast the yukas in a fire like potatoes. Another root eaten by the natives is that of the aloë plant, of which there are many kinds in this country. Those species of this vegetable, however, which afford nourishment —for not all of them are edible—do not grow as plentifully as the Californians might wish, and very seldom in the neighborhood of water; the prepara-

* In the collection of Dr. E. H. Davis, of New York, there are a number of arrows obtained from the Indians of the island of Tiburon, in the Californian gulf. They answer, in every respect, the description given in the text.

tions, moreover, which are necessary to render this plant eatable, require much time and labor, as will be mentioned hereafter. I saw the natives also frequently eat the roots of the common reed, just as they were taken out of the water. Certain seeds, some of them not larger than those of the mustard, and different sorts in pods that grow on shrubs and little trees, and of which there are, according to Father Piccolo, more than sixteen kinds, are likewise diligently sought; yet they furnish only a small quantity of grain, and all that a person can collect with much toil during a whole year may scarcely amount to twelve bushels.*

It can be said that the Californians eat, without exception, all animals they can obtain. Besides the different kinds of larger indigenous quadrupeds and birds already mentioned,† they live now-a-days on dogs and cats; horses, asses and mules; *item*, on owls, mice and rats; lizards and snakes; bats, grasshoppers and crickets; a kind of green caterpillar without hair, about a finger long, and an abominable white worm of the length and thickness of the thumb, which they find occasionally in old rotten wood, and consider as a particular delicacy. The chase of game, such as deer and rabbits, furnishes only a small portion of a Californian's provisions. Supposing that for a hundred families three hundred deer are killed in the course of a year, which is a very favorable estimate, they would supply each family only with three meals in three hundred and sixty-five days, and thus relieve but in a very small degree the hunger and the poverty of these people. The hunting for snakes, lizards, mice and field-rats, which they practice with great diligence, is by far more profitable and supplies them with a much greater quantity of articles for consumption. Snakes, especially, are a favorite sort of small game, and thousands of them find annually their way into the stomachs of the Californians.

In catching fish, particularly in the Pacific, which is much richer in that respect than the gulf of California, the natives use neither nets‡ nor hooks, but a kind of lance,—that is, a long, slender, pointed piece of hard wood, which they handle very dexterously in spearing and killing their prey. Sea-turtles are caught in the same manner.

I have now mentioned the different articles forming the ordinary food of the Californians; but, besides these, they reject nothing that their teeth can chew or their stomachs are capable of digesting, however tasteless or unclean and disgusting it may be. Thus they will eat the leaves of the Indian fig-tree, the tender shoots of certain shrubs, tanned or untanned leather; old straps of raw hide with which a fence was tied together for years; *item*, the bones of poultry, sheep, goats and calves; putrid meat or fish swarming with worms, damaged wheat or Indian corn, and many other things of that sort which may serve to appease the hunger they are almost constantly suffering. Anything that is thrown to the hogs will be also accepted by a Californian, and he takes it without feeling offended, or thinking for a moment that he is treated below his dignity. For this reason no one took the trouble to clean the wheat or maize, which was cooked for them in a large kettle, of the black worms and little bugs, even if the numbers of these vermin had been equal to that of the grains. By a daily distribution of about 150 bushels of bran, (which they are in the habit of eating without any preparation,) I could have induced all my parishioners

* One *malter*, in German, which is about equivalent to twelve bushels.

† In the introduction.

‡ Venegas mentions fishing-nets made of the *pita* plant, (Noticia de la California, vol. i, p. 52.) According to Baegert, (Appendix i, p. 322,) no such plant exists in California, and the word "pita" only signifies the thread twisted from the aloë. In refuting Venegas, Father Baegert hardly ever refers to the original Spanish work, nor mentions the name of its author, but attacks the French translation, which was published in Paris in the year 1767. He probably acted so from motives of delicacy, Venegas himself being a priest and brother Jesuit. The effect of this proceeding, as can be imagined, is comical in a high degree.

to remain permanently in the mission, excepting during the time when the pitahayas are gathered.

I saw one day a blind man, seventy years of age, who was busily engaged in pounding between two stones an old shoe made of raw deer-skin, and whenever he had detached a piece, he transferred it promptly to his mouth and swallowed it; and yet this man had a daughter and grown grand-children. As soon as any of the cattle are killed and the hide is spread out on the ground to dry, half a dozen boys or men will instantly rush upon it and commence to work with knives, flints and their teeth, tearing and scratching off pieces, which they eat immediately, till the hide is full of holes or scattered in all directions. In the mission of St. Ignatius and in others further towards the north, there are persons who will attach a piece of meat to a string and swallow it and pull it out again a dozen times in succession, for the sake of protracting the enjoyment of its taste.

I must here ask permission of the kind reader to mention something of an exceedingly disgusting and almost inhuman nature, the like of which probably never has been recorded of any people in the world, but which demonstrates better than anything else the whole extent of the poverty, uncleanness and voracity of these wretched beings. In describing the pitahayas,* I have already stated that they contain a great many small seeds resembling grains of powder. For some reason unknown to me these seeds are not consumed in the stomach, but pass off in an undigested state, and in order to save them the natives collect, during the season of the pitahayas, that which is discharged from the human body, separate the seeds from it, and roast, grind and eat them, making merry over their loathsome meals, which the Spaniards therefore call the second harvest of the Californians.† When I first heard that such a filthy habit existed among them, I was disinclined to believe the report, but to my utter regret I became afterwards repeatedly a witness to the proceeding, which they are unwilling to abandon like many other bad practices. Yet I must say in their favor that they have always abstained from human flesh, contrary to the horrible usage of so many other American nations who can obtain their daily food much easier than these poor Californians.

They have no other drink but the water, and Heaven be praised that they are unacquainted with such strong beverages as are distilled in many American provinces from Indian corn, the aloë and other plants, and which the Americans in those parts merely drink for the purpose of intoxicating themselves. When a Californian encounters, during his wanderings, a pond or pool, and feels a desire to quench his thirst, he lies flat on the ground and applies his mouth directly to the water. Sometimes the horns of cattle are used as drinking vessels.

Having thus far given an account of the different articles used as aliment by the aborigines of the peninsula, I will now proceed to describe in what manner they prepare their victuals. They do not cook, boil, or roast like people in civilized countries, because they are neither acquainted with these methods, nor possessed of vessels and utensils to employ for such purposes; and, besides, their patience would be taxed beyond endurance, if they had to wait till a piece of meat is well cooked or thoroughly roasted. Their whole process simply consists in burning, singeing, or roasting in an open fire all such victuals as are not eaten in a raw state. Without any formalities the piece of meat, the fish, bird, snake, field-mouse, bat, or whatever it may be, is thrown into the flames, or on the glowing embers, and left there to smoke and to sweat for about a quarter of an hour; after which the article is withdrawn, in most cases

* Introduction.

† This statement is corroborated in all particulars by Clavigero, in his *Storia della California*, (Venice, 1789,) vol. i, p. 117.

only burned or charred on the outside, but still raw and bloody within. As soon as it has become sufficiently cool, they shake it a little in order to remove the adhering dust or sand, and eat it with great relish. Yet I must add here, that they do not previously take the trouble to skin the mice or disembowel the rats, nor deem it necessary to clean the half-emptied entrails and maws of larger animals, which they have to cut in pieces before they can roast them. Seeds, kernels, grasshoppers, green caterpillars, the white worms already mentioned, and similar things that would be lost, on account of their smallness, in the embers and flames of an open fire, are parched on hot coals, which they constantly throw up and shake in a turtle-shell, or a kind of frying-pan woven out of a certain plant. What they have parched or roasted in this manner is ground to powder between two stones, and eaten in a dry state. Bones are treated in like manner.

They eat everything unsalted, though they might obtain plenty of salt; but since they cannot dine every day on roast meat and constantly change their quarters, they would find it too cumbersome to carry always a supply of salt with them.

The preparation of the aloë, also called *mescale* or *maguey* by the Spaniards, requires more time and labor. The roots, after being properly separated from the plants, are roasted for some hours in a strong fire, and then buried, twelve or twenty together, in the ground, and well covered with hot stones, hot ashes, and earth. In this state they have to remain for twelve or fourteen hours, and when dug out again they are of a fine yellow color, and perfectly tender, making a very palatable dish, which has served me frequently as food when I had nothing else to eat, or as dessert after dinner in lieu of fruit. But they act at first as a purgative on persons who are not accustomed to them, and leave the throat somewhat rough for a few hours afterwards.

To light a fire the Californians make no use of steel and flint, but obtain it by the friction of two pieces of wood. One of them is cylindrical, and pointed on one end, which fits into a round cavity in the other, and by turning the cylindrical piece with great rapidity between their hands, like a twirling stick, they succeed in igniting the lower piece, if they continue the process for a sufficient length of time.

The Californians have no fixed time for any sort of business, and eat, consequently, whenever they have anything, or feel inclined to do so, which is nearly always the case. I never asked one of them whether he was hungry, who failed to answer in the affirmative, even if his appearance indicated the contrary. A meal in the middle of the day is the least in use among them, because they all set out early in the morning for their foraging expeditions, and return only in the evening to the place from which they started, if they do not choose some other locality for their night quarters. The day being thus spent in running about and searching for food, they have no time left for preparing a dinner at noon. They start always empty-handed; for, if perchance something remains from their evening repasts, they certainly eat it during the night in waking moments, or on the following morning before leaving. The Californians can endure hunger easier and much longer than other people; whereas they will eat enormously if a chance is given. I often tried to buy a piece of venison from them when the skin had but lately been stripped off the deer, but regularly received the answer that nothing was left; and I knew well enough that the hunter who killed the animal needed no assistance to finish it. Twenty-four pounds of meat in twenty-four hours is not deemed an extraordinary ration for a single person, and to see anything eatable before him is a temptation for a Californian which he cannot resist; and not to make away with it before night would be a victory he is very seldom capable of gaining over himself.

One of them requested from his missionary a number of goats, in order to live, as he said, like a decent man; that is, to keep house, to pasture the goats, and to support himself and his family with their milk and the flesh of the kids. But, alas! in a few days the twelve goats with which the missionary had presented him were all consumed.

A priest who had lived more than thirty years in California, and whose veracity was beyond any doubt, assured me repeatedly that he had known a Californian who one day ate seventeen watermelons at one sitting; and another native who, after having received from a soldier six pounds of unclarified sugar as pay for a certain debt, sat down and munched one piece after another till the six pounds had disappeared. He paid, however, dearly for his gluttony, for he died in consequence of it; while the melon-eater was only saved by taking a certain physic which counteracted the bad effects of his greediness. I was called myself one evening in great haste to three or four persons, who pretended to be dying, and wanted to confess. These people belonged to a band of about sixty souls, (women and children included,) to whom I had given, early in the morning, three bullocks in compensation for some labor. When I arrived at the place where they lay encamped, I learned that their malady consisted merely in belly-ache and vomiting; and, recognizing at once the cause of their disorder, I reprimanded them severely for their voracity, and went home again.

CHAPTER IV.—OF THEIR MARRIAGES AND THE EDUCATION OF THEIR CHILDREN.

As soon as the young Californian finds a partner, the marriage follows immediately afterwards; and the girls go sometimes so far as to demand impetuously a husband from the missionary, even before they are twelve years old, which is their legitimate age for marrying. In all the missions, however, only one excepted, the number of men was considerably greater than that of the females.

Matrimonial engagements are concluded without much forethought or scruple, and little attention is paid to the morals or qualities of the parties; and, to confess the truth, there is hardly any difference among them in these respects; and, as far as good sense, virtue, and riches are concerned, they are always sure to marry their equals, following thus the old maxim: *Si vis nubere, nube pari.* It happens very often that near relations want to join in wedlock, and their engagements have, therefore, to be frustrated, such cases excepted in which the *impedimentum affinitatis* can be removed by a dispensation from the proper authorities.

They do not seem to marry exactly for the same reasons that induce civilized people to enter into that state; they simply want to have a partner, and the husband, besides, a servant whom he can command, although his authority in that respect is rather limited, for the women are somewhat independent, and not much inclined to obey their lords. Although they are now duly married according to the rites of the Catholic church, nothing is done on their part to solemnize the act; none of the parents or other relations and friends are present, and no wedding feast is served up, unless the missionary, instead of receiving his marriage fees, or *jura stolae*, presents them with a piece of meat, or a quantity of Indian corn. Whenever I joined a couple in matrimony, it took considerable time before the bridegroom succeeded in putting the wedding ring on the right finger of his future wife. As soon as the ceremony is over, the new married couple start off in different directions in search of food, just as if they were not more to each other to-day than they were yesterday; and in the same manner they act in future, providing separately for their support, sometimes without living together for weeks, and without knowing anything of their partner's abiding place.

Before they were baptized each man took as many wives as he liked, and if there were several sisters in a family he married them all together. The son-in-law was not allowed, for some time, to look into the face of his mother-in-law or his wife's next female relations, but had to step aside, or to hide himself, when these women were present. Yet they did not pay much attention to consanguinity, and only a few years since one of them counted his own daughter (as he believed) among the number of his wives. They met without any formalities, and their vocabulary did not even contain the words "to marry," which is expressed at the present day in the Waïcuri language by the paraphrase *tikére undiri*—that is, "to bring the arms or hands together." They had, and still use, a substitute for the word "husband," but the etymological meaning of that expression implies an intercourse with women in general.

They lived, in fact, before the establishment of the missions in their country, in utter licentiousness, and adultery was daily committed by every one without shame and without any fear, the feeling of jealousy being unknown to them. Neighboring tribes visited each other very often only for the purpose of spending some days in open debauchery, and during such times a general prostitution prevailed. Would to God that the admonitions and instructions of those who converted these people to Christianity and established lawful marriages among them, had also induced them to desist entirely from these evil practices! Yet they deserve pity rather than contempt, for their manner of living together engenders vice, and their sense of morality is not strong enough to prevent them from yielding to the temptations to which they are constantly exposed.

In the first chapter of this book I have already spoken of the scanty population of this country. It is certain that many of their women are barren, and that a great number of them bear not more than one child. Only a few out of one or two hundred bring forth eight or ten times, and if such is really the case, it happens very seldom that one or two of the children arrive at a mature age. I baptized, in succession, seven children of a young woman, yet I had to bury them all before one of them had reached its third year, and when I was about to leave the country I recommended to the woman to dig a grave for the eighth child, with which she was pregnant at the time. The unmarried people of both sexes and the children generally make a smaller group than the married and widowed.

The Californian women lie in without difficulty, and without needing any assistance. If the child is born at some distance from the mission they carry it thither themselves on the same day, in order to have it baptized, not minding a walk of two or more leagues. Yet, that many infants die among them is not surprising; on the contrary, it would be a wonder if a great number remained alive. For, when the poor child first sees the light of day, there is no other cradle provided for it but the hard soil, or the still harder shell of a turtle, in which the mother places it, without much covering, and drags it about wherever she goes. And in order to be unencumbered, and enabled to use her limbs with greater freedom while running in the fields, she will leave it sometimes in charge of some old woman, and thus deprive the poor creature for ten or more hours of its natural nourishment. As soon as the child is a few months old the mother places it, perfectly naked, astraddle on her shoulders, its legs hanging down on both sides in front, and it has consequently to learn how to ride before it can stand on its feet. In this guise the mother roves about all day, exposing her helpless charge to the hot rays of the sun and the chilly winds that sweep over the inhospitable country. The food of the child, till it cuts its teeth, consists only in the milk of the mother, and if that is wanting or insufficient, there is rarely another woman to be found that would be willing, or, perhaps, in the proper condition, to take pity on the poor starving being. I cannot say that the Californian women are too fond of their children, and some of them may even consider the loss of one as a relief from a burden, especially if they have

already some small children. I did not see many Californian mothers who caressed their children much while they lived, or tore their hair when they died, although a kind of dry weeping is not wanting on such occasions. The father is still more insensible, and does not even look at his (or at least his wife's) child as long as it is small and helpless.

Nothing causes the Californians less trouble and care than the education of their children, which is merely confined to a short period, and ceases as soon as the latter are capable of making a living for themselves—that is, to catch mice and to kill snakes. If the young Californians have once acquired sufficient skill and strength to follow these pursuits, it is all the same to them whether they have parents or not. Nothing is done by these in the way of admonition or instruction, nor do they set an example worthy to be imitated by their offspring. The children do what they please, without fearing reprimand or punishment, however disorderly and wicked their conduct may be. It would be well if the parents did not grow angry when their children are now and then slightly chastised for gross misdemeanor by order of the missionary; but, instead of bearing with patience such wholesome correction of their little sons and daughters, they take great offence and become enraged, especially the mothers, who will scream like furies, tear out the hair, beat their naked breasts with a stone, and lacerate their heads with a piece of wood or bone till the blood flows, as I have frequently witnessed on such occasions.*

The consequence is, that the children follow their own inclinations without any restraint, and imitate all the bad habits and practices of their equals, or still older persons, without the slightest apprehension of being blamed by their fathers and mothers, even if these should happen to detect them in the act of committing the most disgraceful deeds. The young Californians who live in the missions commence roaming about as soon as mass is over, and those that spend their time in the fields go wherever, and with whomsoever, they please, not seeing for many days the faces of their parents, who, in their turn, do not manifest the slightest concern about their children, nor make any inquiries after them. These are disadvantages which the missionary has no power of amending, and such being the case, it is easy to imagine how little he can do by instruction, exhortation, and punishment, towards improving the moral condition of these young natives.

Heaven may enlighten the Californians, and preserve Europe, and especially Germany, from such a system of education, which coincides, in part, with the plan proposed by that ungodly visionary, J. J. Rousseau, in his "Emile," and which is also recommended by some other modern philosophers of the same tribe. If their designs are carried out, education, so far as faith, religion, and the fear of God are concerned, is not to be commenced before the eighteenth or twentieth year, which, if viewed in the proper light, simply means to adopt the Californian method, and to bring up youth without any education at all.

(TO BE CONTINUED IN THE NEXT REPORT.)

* This statement does not seem to agree well with the alleged indifference of the Californian women towards their children, and the formalities which the Californians were obliged to observe, when meeting with the mothers and other female relations of their wives, renders a total absence of jealousy among them rather doubtful. Dr. Waitz has also pointed out the latter discrepancy while citing a number of facts contained in our author's work, (Anthropologie der Naturvœlker, vol. iv, p. 250.) My object being simply to give an English version of Baegert's account, I abstain from all comments on such real or seeming incongruities.

AN ACCOUNT

OF

THE ABORIGINAL INHABITANTS

OF

THE CALIFORNIAN PENINSULA,

AS GIVEN BY

JACOB BAEGERT, A GERMAN JESUIT MISSIONARY, WHO LIVED THERE SEVENTEEN YEARS DURING THE SECOND HALF OF THE LAST CENTURY.

TRANSLATED AND ARRANGED BY CHARLES RAU.

(*Continued from the Smithsonian Report for* 1863.)

CHAPTER V.—THEIR CHARACTER.

In describing the character of the Californians, I can only say that they are dull, awkward, rude, unclean, insolent, ungrateful, given to lying, thievish, lazy, great talkers, and almost like children in their reasoning and actions. They are a careless, improvident, unreflecting people, and possess no control over themselves, but follow, in every respect, their natural instincts almost like animals.

They are, nevertheless, like all other native Americans, human beings, real children of Adam, and have not grown out of the earth, or of stones, like moss and other plants, as a certain impudent, lying freethinker gives to understand. I, at least, never saw one growing in such a way, nor have I heard of any of them who originated in that peculiar manner. Like other people, they are possessed of reason and understanding, and their stupidity is not inborn with them, but the result of habit; and I am of opinion that, if their young sons were sent to European seminaries and colleges, and their girls to convents where young females are instructed, they would prove equal in all respects to Europeans in the acquirement of morals and of useful sciences and arts, as has been the case with many young natives of other American provinces. I have known some of them who learned several mechanical trades in a short time, often merely by observation; and, on the contrary, others who appeared to me duller, after twelve or more years, than at the time when I first became acquainted with them. God and nature have endowed these people with gifts and talents like others; but their rude life hinders the development of these faculties, and thus they remain awkward, dull, and so slow in their understandings that it requires considerable pains, time, and patience to teach them the doctrines and precepts of the Christian faith, insomuch that a sentence of only a few words must be repeated to them twelve times and oftener before they are capable of reciting it.

It may not be out of place to corroborate here what Father Charlevoix says of the Canadians, namely, that no one should think an Indian is convinced of what he has heard because he appears to approve of it. He will assent to anything, even though he has not understood its meaning or reflected upon his answer, and he so does either on account of his indolence or indifference, or from motives of selfishness, in order to please the missionary.

The Californians do not readily confess a crime unless detected in the act, because they hardly comprehend the force of evidence, and are not at all ashamed of lying. A certain missionary sent a native to one of his colleagues with some loaves of bread and a letter stating their number. The messenger ate a part of the bread, and his theft was consequently discovered; another time, when he had to deliver four loaves, he ate two of them, but hid the accompanying letter under a stone while he was thus engaged, believing that his conduct would not be revealed this time, as the letter had not seen him in the act of eating the loaves.

In the mission of St. Borgia the priest ordered his people one day to strew the way with some green herbs, because he was about to bring the holy sacrament to a sick person, and his order was promptly executed by them, but to the great damage of the missionary's kitchen-garden, for they tore up all the cabbages, salad, and whatever vegetables they found there, and threw them on the road.

Yet, notwithstanding their incapacity and slow comprehension, they are, nevertheless, cunning, and show, in many cases, a considerable degree of craftiness. They will sell their poultry to the missionary at the beginning of a sickness, and afterwards exhibit a disposition to eat nothing but chicken-meat, till none of the fowls are left in the coop. A prisoner will feign a dangerous malady and ask for the last sacrament in order to be relieved from his fetters, and to find, subsequently, a chance to escape. They rob the missionary in a hundred ways, and sometimes in the most artful manner. If, for instance, one has pilfered the pantry and left it open in his haste, another one forthwith requests to be admitted to confession, in order to give the thief time for closing the door, and thus to remove all cause of suspicion on the part of the missionary. They also invent stories and relate them to their priest for the purpose of frustrating a marriage engagement, that some other party may obtain the bride. These and many hundred similar tricks have actually been played by them, and show conclusively that they are well capable of reasoning when their self-interest or their needs demand it.

The Californians are audacious and at the same time faint-hearted and timid in a high degree. They climb to the top of the weak, trembling stems, sometimes thirty-six feet high, which are called *cardones* by the Spaniards, to look out for game, or mount an untamed horse, without bridle and saddle, and ride, during the night, upon roads which I was afraid to travel in the daytime. When new buildings are erected, they walk on the miserable, ill-constructed scaffoldings with the agility of cats, or venture several leagues into the open sea on a bundle of brushwood, or the thin stem of a palm-tree, without thinking of any danger. But the report of a gun makes them forget their bows and arrows, and half a dozen soldiers are capable of checking several hundred Californians.

Gratitude towards benefactors, respect for superiors, parents, and other relations, and politeness in intercourse with fellow-men, are almost unknown to them.* They speak plainly, and pay compliments to no one. If one of them has received a present, he immediately turns his back upon the donor and walks off without saying a word, unless the Spanish phrase, *Dios te lo pague*, or, "God reward you," has been previously, by a laborious process, enforced upon his memory.

Where there is no honor, shame is ever wanting, and therefore I always wondered how the word "*ïé*," that is, "to be ashamed," had been introduced

* According to Baegert's own statement, (p. 309,) the forced departure of the Jesuit missionaries from the peninsula caused great distress among the Indians, who expressed their grief by a general howling and weeping, which shows that the feelings of gratitude and attachment were not entirely wanting in their character, although selfishness may have had a large share in the demonstration. The parting scene is well described in a few lines by W. Irving.—*Adv. of Captain Bonneville*, p. 332.

into their language; for, among themselves, no one would blush on account of any misdeed he had perpetrated. If one had killed his father and mother, robbed churches, or committed other infamous crimes, and had been a hundred times whipped and pilloried, he would, nevertheless, strut about with a serene brow and an erect head, and without being in the least degraded in the eyes of his people.

Laziness, lying, and stealing are their hereditary vices and principal moral defects. They are not a people upon whose word any reliance can be placed, out they will answer in one breath six times "yes" and as many times "no," without feeling ashamed, or even perceiving that they contradict themselves. They are averse to any labor not absolutely necessary to supply them with the means of satisfying hunger. If any work occurred in the mission, it was necessary to drive and urge them constantly to their task, and a great number complained of sickness during the week-days, for which reason I always called the Sunday a day of miracles, because all those who had been sick the whole week felt wonderfully well on that day. If they were only a little more industrious, they might improve their condition, to a certain extent, by planting some maize, pumpkins, and cotton, or by keeping small flocks of goats, sheep, or even a few cattle; and, having now learned to prepare the skins of deer, they could easily supply themselves with garments. But nothing of this kind is to be expected of them. They do not care to eat pigeons, unless they fly roasted into their mouths.* To work to-day and to earn the fruit of their labor only three or six months afterwards seems to be incompatible with their character, and for this reason there is little hope that they will ever adopt a different mode of life.

Books could be filled with accounts of their thefts. They will not touch gold or silver; but anything that can be chewed, be it raw or cooked, above the ground or below, ripe or unripe, is not more safe from them than the mouse from the cat, if the eye of the owner be only diverted for a moment. The herdsman will not even spare the dog that has been given to him to watch the flock of sheep or goats intrusted to his care. While one day observing, unseen, my cook, who was engaged in boiling meat, I noticed that he took one piece after another out of the kettle, bit off a part, and threw it again into the vessel. The meal on the missionary's table, when he is suddenly called away, is not safe from their thievery, and even the holy wafers in the sacristy are in danger of being taken by them. Yet they sometimes lay their hands on things of which they can make no use whatever, in a way really surprising, which shows to what degree stealing has become a habit with them.

For eight years I kept, ranging at large, from four to five hundred head of cattle, and sometimes as many goats and sheep, until the constant robberies of the Indians of my own and the neighboring mission compelled me to give up cattle-breeding.† In the bodies of nineteen cows and oxen, that had been killed in one day in the mission, there were found, after the removal of the skin, more than eight flint-points of arrows, the shafts of which had been broken off by the wounded animals while passing through the rocks and bushes. I believe that more of these animals were killed and eaten by the natives than were brought to the mission for consumption, and horses and asses suffered in like manner.

---

* German proverb.

† The cattle, as well as the goats and sheep, are described as small and lean, owing to the scanty pasturage. The horses, though small, were of a good breed and enduring, but they did not sufficiently multiply, and fresh animals had to be imported every year to mount the soldiers and cowherds. "The ass alone," says the author, "which is nowhere choice, but always contented, fares tolerably well in California. He works but little, and feeds on the prickly shrubs with as much relish as if they were the most savory oats." The number of hogs on the whole peninsula hardly amounted to a dozen.

In order to be exempt from labor, or to escape the punishment for gross misdeeds, the Californians sometimes counterfeit dangerously sick or dying persons. Many of those who were carried to the mission in such a feigned state by their comrades received a sound flogging, which suddenly restored them to health. Without mentioning all the cases that fell under my notice, I will speak of two individuals who represented dying persons so well that I did not hesitate to give them extreme unction. Another really frightened me by pretending to be infected with the smallpox, which actually raged in the neighboring mission, causing its priest for three months, day and night, a vast deal of trouble and care, and keeping him almost constantly on horseback. A fourth, whose name was Clement, seemed also resolved to give up the ghost. With him, however, the difficulty was that he had never seen a dying person, not even his wife, whom I had buried, and often visited during her sickness, without ever finding the husband at home. But having witnessed the death of many cows and oxen, which his arrows had brought down, he imitated the dying beast so naturally, by lolling out his tongue and licking his lips, that he went afterwards always by the name of *Clemente vacca* or *Cow Clement*.

Nothing excites the admiration of the Californians. They look upon the most splendid ecclesiastic garments, embroidered with gold and silver, with as much indifference as though the material consisted of wool and the galoons of common flax. They would rather see a piece of meat than the rarest manufactures of Milan and Lyons, and resemble, in that respect, a certain Canadian who had been in France, and remarked, after his return to Canada, that nothing in Paris had pleased him better than the butcher-shops.*

They are not in the least degree susceptible of disgust, but will touch and handle the uncleanest objects as though they were roses, killing spiders with their fists, and taking hold of toads without aversion. They use as a covering the filthiest rag, and wear it until it rots on their bodies. In person they are exceedingly dirty, and waste hardly any time in decorating and embellishing themselves. I must mention here, also, that they are in the habit of washing themselves with urine, which renders their persons very disagreeable, as I have often experienced when I had to confess them. I was informed by reliable people that they eat a certain kind of large spiders, and likewise the vermin which they take from each other's heads; but I never saw them doing it: whereas I saw them frequently fetch their maize porridge at noon in a half-cleaned turtle-shell which they had used the whole morning to carry the dung from the folds of the sheep and goats.

Concerning their improvement by the introduction of the Christian religion, I am unable to bestow much praise upon those among whom I lived seventeen years, during which period I had sufficient opportunity to become thoroughly acquainted with their character; but I must confess, to my greatest affliction, that the seed of the Divine Word has borne but little fruit among them; for this seed fell into hearts already obdurated in vice from their very infancy by seduction and bad example, which all pains and exertions on the part of the missionary were unavailing to remove. The occasions for evil-doing, among young and old, are of daily occurrence, and numberless. The parents themselves give the worst example, and the Spanish soldiers, cowherds, and a few others who come to the country for the purpose of pearl-fishing and mining, contribute not a little to increase vice among the native population. The mo-

* Mr. Catlin relates a similar circumstance of a party of Iowa Indians that were exhibited in London. After their first drive through the city, "they returned to their lodgings in great glee, and amused us at least for an hour with their first impressions of London, the leading, striking feature of which, and the one that seemed to afford them the greatest satisfaction, was the quantity of fresh meat that they saw in every street hanging up at the doors and windows."—*Catlin's Notes of Eight Years' Travels and Residence in Europe.* New York, 1848: vol. ii, p. 9.

tives, on the other hand, which act elsewhere as checks upon the conduct of the people, and keep them within the bounds of decency, are not at all understood or appreciated by the Californians, for which reason the teachings of religion can make but little impression upon their unprepared minds; and being thus unrestrained by any considerations, they easily yield to the impulses of their character, in which a strong passion for illegal sexual intercourse forms a prominent feature. In all bad habits and vices the Californian women fully equal the men, but surpass them in impudence and want of devotion, contrary to the habit of the female sex in all the rest of the world. There were certainly some among the Californians who led edifying lives and behaved in a praiseworthy manner after having embraced the Christian faith; but their number was very small; the reverse, on the contrary, being the general rule to such a degree that the wicked and vicious formed the great majority of the natives.

CHAPTER VI.—THEIR CHARACTER, CONTINUED.—AN ACCOUNT OF THE ASSASSINATION OF THE JESUIT FATHERS TAMARAL AND CARRANCO.*

To all other bad qualities of the Californians may be added their vindictiveness and cruelty. They care very little for the life of man, and an insignificant cause will stimulate them to commit a murder. Among other cases which happened while I lived in their country, I will mention that of the master of a small ship loaded with provisions for two poor missions. This man had scolded a number of natives for some cause or other, which they resented by breaking his skull with a heavy stone, while he was eating his supper on the shore. His ship they abandoned to wind and waves. In the year 1760, a boy of about sixteen years stabbed another of the same age with a knife in the abdomen, and struck him on the head with a heavy club, almost within sight of the whole tribe, and only a stone's throw from the church and the house of the missionary. The murderer had already selected a horse on which to escape, and intended to save himself within a church thirty leagues distant from the place where the crime was committed; but he failed to effect his flight.†

Up to the year 1750 the Californians had revolted at different times and places, and compelled several missionaries to abandon their stations, and to seek safety in other quarters. The natives were stirred up to these insurrections either by their conjurers or sorcerers, whose influence had been considerably reduced, or because it was requested of them to keep those promises which they had made when receiving the holy baptism.

The most extensive and dangerous revolt of all began in the year 1733, in the southern part of the peninsula, among two tribes called the *Pericúes* and *Coras*, who are to this day of a very fierce, unruly, and untractable character, and who gave much trouble to Father Ignatius Tirs, from Kommotau, in Bohemia, the last Jesuit missionary who resided in their district.‡

In the year 1733 there existed in that part of the country, which was inhabited by several thousand natives, four missions, with three priests, who had in all only six soldiers for their protection. The missions were the following: *La Paz*, without a resident priest, and guarded by one soldier; *St. Rosa*, under Father Sigismund Taraval, a Spaniard, born in Italy, protected by three soldiers; *St. Yago*, over which Father Lorenzo Carranco, a Mexican, of Spanish

* This episode in the missionary history of California forms a separate chapter in the third part of our author's work; but as it throws much light on the temperament of the natives, I have inserted it in this place.

† This church was probably considered as an asylum or place of safety.

‡ He was one of those who shared with the author, in 1767, the fate of banishment. At that time there were in all sixteen Jesuits in Lower California—fifteen priests and one lay brother. Six of them were Spaniards, two Mexicans, and eight Germans. The names of the latter are given on page 312 by the author, who omits, however, his own name in order to preserve his anonymous character.

parentage, resided, with two soldiers; and *St. Joseph del Cabo*, under Father Nicolas Tamaral, from Sevilla, in Spain, without any guard.

The motives leading to this insurrection, which were afterwards freely divulged by the natives, consisted in their unwillingness to content themselves with one wife, although they had promised to renounce polygamy, and their displeasure at being reprimanded for certain transgressions deserving the censure of their spiritual advisers. The ringleaders and principal movers of the rebellion were two individuals, *Botòn* and *Chicóri* by name, who exerted a great influence among the natives, and prepared everything in secret for the outbreak. Their object was to kill the three priests, to exterminate all traces of Christianity, which most of them had adopted ten years before, and to resume their former loose and independent manner of living. Their design became, however, known, and the fire was extinguished before it could blaze up in full flames. The Indians feigned a friendly disposition, and a kind of peace was established towards the beginning of the year 1734. But as this peace was not concluded with sincerity, it could not be of a long duration. The treacherous rebels soon again made attempts to carry out at all hazards the objects they had in view, and really succeeded in the following October, though not so completely as they wished, since Father Taraval found the means to escape their murderous hands.

The six soldiers were their principal obstacle. Meeting in the field with one of them of the mission of St. Rosa, they assassinated him, and sent word to the mission that he was very ill, requesting the priest either to come to the place in order to confess him, or to order the two remaining soldiers to transport the patient to the station, their intention being to decoy the one or the others, and to take their lives. But fortunately the messenger delivered his commission in such an awkward manner that the crime they had already perpetrated, as well as their further designs, could be easily divined, for which reason neither the priest nor the soldiers complied with their request. A few days afterward they killed also the only soldier belonging to the mission de la Paz.

The rumor of these two murders, and other indubitable signs of an impending mutiny and general uprising in the south, were spread abroad, and soon reached the ears of the Superior of the missions, who was then at that of the Seven Dolors, nearly ninety leagues from the place where these events had occurred. He sent orders immediately to the three priests whose lives were endangered to save themselves by flight, but the letters fell into the hands of the mutineers, and would, besides, at any rate have arrived too late to avert the peril.

It was the intention of the conspirators to strike the first blow against the mission of St. Joseph and Father Tamaral; but learning that Father Carranco had already received intelligence of their plans, they rushed with all speed upon his mission before he could make any preparations for defence, or effect his escape from the place. It was on a Saturday, and the 2d of October, when they arrived at the mission of St. Yago. The father had just said mass, and had locked himself in his room to perform his private devotions. Most unfortunately the two soldiers, who formed his whole body-guard, had left the place on horseback in order to bring in some head of cattle for the catechumens and other people of the mission. After a while the returned messengers, whom Father Carranco had despatched to the mission of St. Joseph to warn Father Tamaral of the danger to which he was exposed, entered the room. Father Carranco was reading his answer, when the murderers entered the house and fell upon him. Some threw him on the ground and dragged him by his feet to the front of the church, while others pierced his body with many arrows, and beat him with stones and clubs till he expired.

A little native boy, who used to wait upon the father when he took his meals, was a witness to the act, and shed tears when he beheld his benefactor's mournful fate; upon which one of the barbarians seized the boy by the legs and smashed his head against the wall, saying, that since he showed so much

regret at the death of his master, he should also serve him and bear him company in the other world. Among the murderers were some whom the father had considered as the most reliable of his flock, and whose fidelity he never had doubted.

Having torn the garments from the lifeless body, they treated it in a most abominable manner in order to wreak their vengeance, and they finally threw it on a burning pile. After this they set the church and the house on fire, and burned to ashes the utensils of the church, the altar, the representations of our Saviour and of the Saints, and everything else that they could not apply to their own use. In the mean time the two unarmed soldiers, who had been sent after cattle, returned. They were compelled to dismount and to kill the cows for the malefactors, after which the savages despatched them with a shower of arrows.

On the following day, the same fate befell Father Tamaral, the priest of the mission of St. Joseph, twelve leagues distant from that of St. Yago, for as soon as the villains had committed their crime at the one place, they directed their march to the other. Father Tamaral, not believing the report of his colleague, was quietly sitting in his house, when the savage crowd, considerably increased by members of his own parish, made their appearance in the mission. In their usual manner, they demanded something from the missionary, for the purpose of finding a pretext for quarrelling and commencing their hostilities, in case the priest should disappoint them in their wishes. But their behavior, and the arms which they all carried with them, soon convinced the missionary that they had other designs, and he consequently not only complied with their requests, but gave them even more than they demanded. Being thus baffled in their attempt, and full of eagerness to carry out their bloody plan, they put aside all dissimulation and attacked the missionary without further delay. They threw him on the ground, dragged him into the open air, and discharged their arrows upon him. One of their number, whom the father had a short time before presented with a large knife, added ingratitude to cruelty by burying the weapon in his body.

Thus the Fathers Tamaral and Carranco were led to the shambles by their own flock, and closed their days in California, after they had spent many years in that country, and, by a blameless life and great zeal, proved themselves worthy to die the death of martyrs. The abuses to which the savages subjected the body of the deceased priest were greater, in this instance, and they exhibited more wantonness in the destruction of the church and other property than on the preceding day, because the crowd was larger and had become more infuriated by previous success.

Father Taraval, of St. Rosa, the third priest of whom they intended to make a victim, succeeded in making good his flight. He sojourned for the moment on the western coast of California, at the station of All Saints, which formed an adjunct to his own mission, and was a two days' journey distant from St. Joseph. Being warned in due time by some faithful Indians of the danger that threatened him, he packed up in great haste his most needful things and rode at full speed, in company with his two soldiers, during the night of the fourth of October towards the opposite shore of the peninsula, where he embarked near the mission of La Paz in a small vessel, which had been despatched to that place when the first news of the impending rebellion became known. He landed in safety at the mission of the Seven Dolors, then situated near the sea; leaving behind him the smoking ruins of four missions that had been totally destroyed in less than four days, but which could only be rebuilt and raised to their former importance with great sacrifices of time, labor, and human life.

The rebels, however, fared badly, and had no cause to glory in their triumph. The southern tribes, whose number was four thousand souls at the outbreak of the revolt, are now reduced to four hundred, for not only was war waged against

them by the Californian and foreign militia, but they had also quarrels among themselves.* Yet these causes were less effective in their destruction than the loathsome diseases and ulcers by which they were visited, and among the four hundred that now remain, only a few are free from the general malady and enjoy the blessing of sound health.

On the other hand, be that grace of Heaven a thousand times praised, which, in our day also, inspires among the members of the Catholic priesthood, and especially in the Society of Jesus, men of superior courage who, without the slightest self-interest and for the sole purpose of propagating the Christian faith, not only brave all dangers to which they are exposed in wild countries and amidst barbarous tribes, but who also willingly give up their lives when occasion demands such sacrifices! For besides these two Californian missionaries, many others belonging to the same society have suffered death in the course of this century, while engaged in the conversion of heathen nations. Among the great number of these victims, I will only mention Father Thomas Tello, a Spaniard, and Father Henry Ruhen, a German from Westphalia, both Jesuits, who were killed as late as 1751, by the mutinous Pimas, on the other side of the Californian gulf. With Father Ruhen, I had crossed the Atlantic ocean a year before, and we made also in company the journey overland as far as the Pimeria, where he closed his days six months after his arrival.

CHAPTER VII.—THEIR TREATMENT OF THE SICK.—FUNERAL CUSTOMS.

With all their poor diet and hardships, the Californians are seldom sick. They are in general strong, hardy, and much healthier than the many thousands who live daily in abundance and on the choicest fare that the skill of Parisian cooks can prepare. It is very probable that most Californians would attain a considerable age, after having safely passed through the dangers of their childhood; but they are immoderate in eating, running, bathing, and other matters, and thus doubtless shorten their existence. Excepting consumption and that disease which was brought from America to Spain and Naples, and from thence spread over various countries, they are but little subject to the disorders common in Europe; podagra, apoplexy, dropsy, cold and petechial fevers being almost unknown among them. There is no word in their language to express sickness in general or any particular disease. "To be sick," they signify by the phrase *atemba-tie*, which means "to lie down on the ground," though all those in good health may be seen in that position the whole day, if they are not searching for food or otherwise engaged. When I asked a Californian what ailed him, he usually said, "I have a pain in my chest," without giving further particulars.

For the small-pox the Californians are, like other Americans, indebted to Europeans, and this disease assumes a most pestilential character among them. A piece of cloth which a Spaniard, just recovered from the small-pox, had given to a Californian communicated, in the year 1763, the disease to a small mission, and in three months more than a hundred individuals died, not to speak of many others who had been infected, but were saved by the unwearied pains and care of the missionary. Not one of them would have escaped the malady, had not the majority run away from the neighborhood of the hospital as soon as they discovered the contagious nature of the disease.

In the month of April of the same year, 1763, a young and strong woman of my mission was seized with a very peculiar disorder, consisting in eructa-

* This is the only instance in which the author alludes to wars among the natives in the body of his book, though the first appendix contains, on page 328, the following remark in refutation of a passage in the French translation of Venegas's work: "All that is said in reference to the warfare of the Californians is wrong. In their former wars they merely attacked the enemy unexpectedly during the night, or from an ambush, and killed as many as they could, without order, previous declaration of war, or any ceremonies whatever."

tions of such violent character that the noise almost resembled thunder, and could be heard at a distance of forty and more paces. The eructations lasted about half a minute, and followed each other after an interval of a few minutes. The appetite of the patient was good, and she complained of nothing else. In this condition she remained for a week, when she suddenly dropped down in such a manner that I thought she would never rise again; but I was mistaken, for the eructations and the peculiar fits continued for three years, until she became at last emaciated and died in the month of July, 1766. A few days after the outbreak of her malady, her husband was attacked by the same disorder, and on my departure, in 1768, I left him without hope of recovery. Subsequently the woman's brother and his wife suffered in like manner, and after these several other Californians, principally of the female sex. Neither the oldest of the natives, nor missionaries living for thirty years in the country, had hitherto been acquainted with this extraordinary and apparently contagious disease.

The patience of Californians in sickness is really admirable. Hardly a sigh is heaved by those who lie on the bare ground in the most pitiable condition and racked with pain. They look without dread upon their ulcers and wounds, and submit to burning and cutting, or make incisions in their own flesh for extracting thorns and splinters, with as much indifference as though the operation were performed on somebody else. It is, however, an indication of approaching death when they lose their appetite.

Their medical art is very limited, consisting almost exclusively, whatever the character of the disease may be, in the practice of binding, when feasible, a cord or coarse rope tightly around the affected part of the body. Sometimes they make use of a kind of bleeding by cutting with a sharp stone a few small openings in the inflamed part, in order to draw blood and thus relieve the patient. Though every year a number of Californians die by the bite of the rattlesnake, their only remedy against such accidents consists in tightly binding the injured member a little above the wound towards the heart; but if the part wounded by the reptile is a finger or a hand, they simply cut it off, and I knew several who had performed this cure on themselves or on individuals of their families. Now-a-days they beg in nearly all cases of disease for tallow to rub the affected part, and also for Spanish snuff which they use against headache and sore eyes. Excepting the remedies just mentioned, they have no appliances whatever against ulcers, wounds, or other external injuries, and far less against internal disorders; and though they may repeatedly have seen the missionary using some simple for removing a complaint, they will, either from forgetfulness or indolence, never employ it for themselves or others, but always apply to the missionary again.

They do not, however, content themselves with these natural remedies, but have also recourse to supernatural means, which certainly never brought about a recovery. There are many impostors among them, pretending to possess the power of curing diseases, and the ignorant Indians have so much faith in their art that they send for one or more of these scoundrels whenever they are indisposed. In treating a sick person, these jugglers employ a small tube, which they use for sucking or blowing the patient for a while, making, also, various grimaces and muttering something which they do not understand themselves, until, finally, after much hard breathing and panting, they show the patient a flint, or some other object previously hidden about their persons, pretending to have at last removed the real cause of the disorder. Twelve of these liars received one day, by my orders, the punishment they deserved, and the whole people had to promise to desist in future from these practices, or else I would no more preach for them. But when, a few weeks afterwards, that individual, who first of all had engaged to renounce the devil, fell sick, he sent immediately again for the blower to perform the usual jugglery.

It is to be feared that some of those who are seized with illness far from the mission, and not carried thither, are buried alive, especially old people, and such as have few relations, for they are in the habit of digging the grave two or three days before the patient breathes his last. It seems tedious to them to spend much time near an old, dying person that was long ago a burden to them and looked upon with indifference. A person of my acquaintance restored a girl to life that was already bound up in a deer-skin, according to their custom, and ready for burial, by administering to her a good dose of chocolate. She lived many years afterwards. On their way to the mission, some natives broke the neck of a blind, sick old woman, in order to be spared the trouble of carrying her a few miles further. Another patient, being much annoyed by gnats, which no one felt inclined to keep off from him, was covered up in such a manner that he died of suffocation. In transporting a patient from one place to another, they bind him on a rude litter, made of crooked pieces of wood, which would constitute a perfect rack for any but Indian bones, the carriers being in the habit of running with their charge.

Concerning their consciences and eternity, the Californians are perfectly quiet during their sickness, and die off as calmly as though they were sure of heaven. As soon as a person has given up the ghost, a terrible howling is raised by the women that are present, and by those to whom the news is communicated, yet no one sheds tears, excepting, perhaps, the nearest relations, and the whole proceeding is a mere ceremony. But who would believe that some of them show a dislike to be buried according to the rites of the Catholic religion? Having noticed that certain individuals, who were dangerously sick, yet still in possession of their faculties, objected to being led or carried to the mission, in order to obtain there both spiritual and material assistance, I inquired the cause of this strange behavior, and was informed they considered it as a derision of the dead to bury them with ringing of the bells, chanting, and other ceremonies of the Catholic church.

One of them told me they had formerly broken the spine of the deceased before burying them, and had thrown them into the ditch, rolled up like a ball, believing that they would rise up again if not treated in this manner. I saw them, however, frequently putting shoes on the feet of the dead, which rather seems to indicate that they entertain the idea of a journey after death; but whenever I asked them why they observed this probably very ancient custom, they could not give me any satisfactory answer. In time of mourning, both men and women cut off their hair almost entirely, which formerly was given to their physicians or conjurers, who made them into a kind of mantle or large wig, to be worn on solemn occasions.

When a death has taken place, those who want to show the relations of the deceased their respect for the latter lie in wait for these people, and if they pass they come out from their hiding-place, almost creeping, and intonate a mournful, plaintive, *hu, hu, hu!* wounding their heads with pointed, sharp stones, until the blood flows down to their shoulders. Although this barbarous custom has frequently been interdicted, they are unwilling to discontinue it. When I learned, a few years ago, that some had been guilty of this transgression after the death of a certain woman, I left them the choice either to submit to the fixed punishment or to repeat this mourning ceremony in my presence. They chose the latter, and, in a short time, I saw the blood trickling down from their lacerated heads.

CHAPTER VIII.—THEIR QUALIFICATIONS AND MANNERS.

From what I have already said of the Californians, it might be inferred that they are the most unhappy and pitiable of all the children of Adam. Yet such a supposition would be utterly wrong, and I can assure the reader that, as far as their temporal condition is concerned, they live unquestionably much

happier than the civilized inhabitants of Europe, not excepting those who seem to enjoy all the felicity that life can afford. Habit renders all things endurable and easy, and the Californian sleeps on the hard ground and in the open air just as well and soft as the rich European on the curtained bed of down in his splendidly decorated apartment. Throughout the whole year nothing happens that causes a Californian trouble or vexation, nothing that renders his life cumbersome and death desirable; for no one harasses and persecutes him, or carries on a lawsuit against him; neither a hail-storm nor an army can lay waste his fields, and he is not in danger of having his house and barn destroyed by fire. Envy, jealousy, and slander embitter not his life, and he is not exposed to the fear of losing what he possesses, nor to the care of increasing it. No creditor lays claim to debts; no officer extorts duty, toll, poll-tax, and a hundred other tributes. There is no woman that spends more for dress than the income of the husband allows; no husband who gambles or drinks away the money that should serve to support and clothe the family; there are no children to be established in life; no daughters to be provided with husbands; and no prodigal sons that heap disgrace upon whole families. In one word, the Californians do not know the meaning of *meum* and *tuum*, those two ideas which, according to St. Gregory, fill the few days of our existence with bitterness and uncountable evils.

Though the Californians seem to possess nothing, they have, nevertheless, all that they want, for they covet nothing beyond the productions of their poor, ill-favored country, and these are always within their reach. It is no wonder, then, that they always exhibit a joyful temper, and constantly indulge in merriment and laughter, showing thus their contentment, which, after all, is the real source of happiness.

The Californians know very little of arithmetic, some of them being unable to count further than *six*, while others cannot number beyond *three*, insomuch that none of them can say how many fingers he has. They do not possess anything that is worth counting, and hence their indifference. It is all the same to them whether the year has six or twelve months, and the month three or thirty days, for every day is a holiday with them. They care not whether they have one or two or twelve children, or none at all, since twelve cause them no more expense or trouble than one, and the inheritance is not lessened by a plurality of heirs. Any number beyond six they express in their language by *much*, leaving it to their confessor to make out whether that number amounts to seven, seventy, or seven hundred.

They do not know what a year is, and, consequently, cannot say when it begins and ends. Instead of saying, therefore, "a year ago," or "during this year," the Californians who speak the Waïcuri language use the expressions, *it is already an ambia past*, or, *during this ambia*, the latter word signifying the pitahaya fruit, of which a description has been given on a previous page. A space of three years, therefore, is expressed by the term "three pitahayas;" yet they seldom make use of such phrases, because they hardly ever speak among themselves of years, but merely say, "long ago," or, "not long ago," being utterly indifferent whether two or twenty years have elapsed since the occurrence of a certain event. For the same reason they do not speak of months, and have not even a name for that space of time. A week, however, they call at present *ambúja*, that is, "a house," or "a place where one resides," which name they have now, *per antonomasiam*, bestowed upon the church They are divided into bands, which alternately spend a week at the mission, where they have to attend church-service, and thus the week has become among them synonymous with the church.

When the Californians visit the missionary for any purpose, they are perfectly silent at first, and when asked the cause of their visit, their first answer is *vára*, which means "nothing." Having afterwards delivered their speech,

they sit down, unasked; in doing which the women stretch out their legs, while the men cross them in the oriental fashion. The same habits they observe also in the church and elsewhere. They salute nobody, such a civility being unknown to them, and they have no word to express greeting. If something is communicated to them which they do not like, they spit out sideways and scratch the ground with their left foot to express their displeasure.

The men carry everything on their heads; the women bear loads on their backs suspended by ropes that pass around their foreheads, and in order to protect the skin from injury, they place between the forehead and the rope a piece of untanned deer-hide, which reaches considerably above the head, and resembles, from afar, a helmet, or the high head-dress worn by ladies at the present time.

The Californians have a great predilection for singing and dancing, which are always performed together; the first is called *ambéra diti*, the latter *agénari*. Their singing is nothing but an inarticulate, unmeaning whispering, murmuring, or shouting, which every one intonates according to his own inclination, in order to express his joy. Their dances consist in a foolish, irregular gesticulating and jumping, or advancing, retreating, and walking in a circle. Yet, they take such delight in these amusements that they spend whole nights in their performance, in which respect they much resemble Europeans, of whom certainly more have killed themselves during Shrovetide and at other times by dancing, than by praying and fasting. These pastimes, though innocent in themselves, had to be rigidly interdicted, because the grossest disorders and vices were openly perpetrated by the natives during the performances; but it is hardly possible to prevent them from indulging in their sports. While speaking of these exercises of the natives, I will also mention that they are exceedingly good runners. I would gladly have yielded up to them my three horses for consumption if I had been as swift-footed as they; for, whenever I travelled, I became sooner tired with riding than they with walking. They will run twenty leagues to-day, and return to-morrow to the place from whence they started without showing much fatigue. Being one day on the point of setting out on a journey, a little boy expressed a wish to accompany me, and when I gave him to understand that the distance was long, the business pressing, and my horse, moreover, very brisk, he replied with great promptness: "Thy horse will become tired, but I will not." Another time I sent a boy of fourteen years with a letter to the neighboring mission, situated six leagues from my residence. He started at seven o'clock in the morning, and when about a league and a half distant from his place of destination, he met the missionary, to whom the letter was addressed, mounted on a good mule, and on his way to pay me a visit. The boy turned round and accompanied the missionary, with whom he arrived about noon at my mission, having walked within five hours a distance of more than nine leagues.

With boys and girls who have arrived at the age of puberty, with pregnant women, new-born children, and women in child-bed, the Californians observed, and still secretly observe, certain absurd ceremonies of an unbecoming nature, which, for this reason, cannot be described in this book.

There existed always among the Californians individuals of both sexes who played the part of sorcerers or conjurers, pretending to possess the power of exorcising the devil, whom they never saw; of curing diseases, which they never healed; and of producing pitahayas, though they could only eat them. Sometimes they went into caverns, and, changing their voices, made the people believe that they conversed with some spiritual power. They threatened also with famine and diseases, or promised to drive the small-pox and similar plagues away and to other places. When these braggarts appeared formerly in their gala apparel, they wore long mantles made of human hair, of which the missionaries burned a great number in all newly established missions. The object

of these impostors was to obtain their food without the trouble of gathering it in the fields, for the silly people provided them with the best they could find, in order to keep them in good humor and to enjoy their favor. Their influence is very small now-a-days; yet the sick do not cease to place their confidence in them, as I mentioned in the preceding chapter.

It might be the proper time now to speak of the form of government and the religion of the Californians previous to their conversion to Christianity; but neither the one nor the other existed among them. They had no magistrates, no police, and no laws; idols, temples, religious worship or ceremonies were unknown to them, and they neither believed in the true and only God, nor adored false deities.* They were all equals, and every one did as he pleased, without asking his neighbor or caring for his opinion, and thus all vices and misdeeds remained unpunished, excepting such cases in which the offended individual or his relations took the law into their own hands and revenged themselves on the guilty party. The different tribes represented by no means communities of rational beings, who submit to laws and regulations and obey their superiors, but resembled far more herds of wild swine, which run about according to their own liking, being together to-day and scattered to-morrow, till they meet again by accident at some future time. In one word, the Californians lived, *salva venia*, as though they had been freethinkers and materialists.†

I made diligent inquiries, among those with whom I lived, to ascertain whether they had any conception of God, a future life, and their own souls, but I never could discover the slightest trace of such a knowledge. Their language has no words for "God" and "soul," for which reason the missionaries were compelled to use in their sermons and religious instructions the Spanish words *Dios* and *alma*. It could hardly be otherwise with people who thought of nothing but eating and merry-making and never reflected on serious matters, but dismissed everything that lay beyond the narrow compass of their conceptions with the phrase *aipekériri*, which means "who knows that?" I often asked them whether they had never put to themselves the question who might be the creator and preserver of the sun, moon, stars, and other objects of nature, but was always sent home with a *vára*, which means "no" in their language.

CHAPTER IX.—HOW THEY LIVED BEFORE AND AFTER THEIR CONVERSION.

I will now proceed to describe in a few words in what manner the unbaptized Californians spent their days.

In the evening, when they had eaten their fill, they either lay down, or sat together and chatted till they were tired of talking, or had communicated to each other all that they knew for the moment. In the morning they slept until hunger forced them to rise. As soon as they awakened, the eating recommenced, if anything remained; and the laughing, talking, and joking were likewise resumed. After this morning-prayer, when the sun was already somewhat high, the men seized their bows and arrows, and the women hitched on their yokes and turtle-shells. Some went to the right, others to the left; here six, there four, eight, or three, and sometimes one alone, the different bands always continuing the laughing and chattering on their way. They looked around to espy a mouse, lizard, snake, or perhaps a hare or deer; or tore up here and there a yuka or other root, or cut off some aloës. A part of the day

* According to Father Piccolo, the Californians worshipped the moon; and Venegas mentions the belief in a good and bad principle as prevailing among the Pericues and Cotchimies.—(*Waitz, Anthropologie der Naturvölker*, vol. iv, p. 250.) These statements are emphatically refuted by Baegert in his first appendix, p. 315, where he says: "It is not true that they worshipped the moon, or practiced any kind of idolatry."

† This is literally his expression.

thus spent, a pause was made. They sat or lay down in the shade, if they happened to find any, without, however, allowing their tongues to come to a stand-still, or they played or wrestled with each other, to find out who was the strongest among them and could throw his adversaries to the ground, in which sport the women likewise participated. Now they either returned to the camping-place of the preceding night, or went a few leagues further, until they came to some spot supplied with water, where they commenced singeing, burning, roasting, and pounding the captures they had made during the day. They ate as long as they had anything before them and as there was room in their stomachs, and after a long, childish or indecent talk, they betook themselves to rest again. In this manner they lived throughout the whole year, and their conversation, if it did not turn on eating, had always some childish trick or knavery for its subject. Those of the natives who cannot be put to some useful labor, while living at the mission, spend their time pretty much in the same way.

Who would expect, under these circumstances, to find a spark of religion among the Californians? It is true, they spoke of the course taken by a deer that had escaped them at nightfall with an arrow in his side, and which they intended to pursue the next morning, but they never speculated on the course of the sun and the other heavenly bodies; they talked about their pitahayas, even long before they were ripe, yet it never occurred to them to think of the Creator of the pitahayas and other productions around them.

I am not unacquainted with the statement of a certain author, according to which one Californian tribe at least was found to possess some knowledge of the incarnation of the Son of God and the Holy Trinity; but this is certainly an error, considering that such a knowledge could only have been imparted by the preachers of the Gospel. The whole matter doubtless originated in a deception on the part of the natives, who are very mendacious and inclined to invent stories calculated to please the missionary; while, on the other hand, every one may be easily deceived by them who has not yet found out their tricks. It is, moreover, a very difficult task to learn anything from them by inquiry; for, besides their shameless lies and unnecessarily evasive answers, they entangle, from inborn awkwardness, the subject in question in such a pitiable manner, and contradict themselves so frequently, that the inquirer is very apt to lose his patience. A missionary once requested me to find out whether a certain N. had been married before his baptism, which he received when a grown man, with the sister of M. A simple "yes" or "no" would have answered the question and decided the matter at once. But the examination lasted about three-quarters of an hour, at the end of which I knew just as little as before. I wrote down the questions and answers, and sent the protocol to the missionary, who was no more successful than myself in arriving at the final result, whether N. had been the husband of the sister of M. or not. So confused are the minds of these Californian Hottentots.

Of baptized Indians, there resided in each mission as many as the missionary could support and occupy with field-labor, knitting, weaving, and other work. Where it was possible to keep a good number of sheep, spinning-wheels and looms were in operation, and the people received more frequently new clothing than at other stations. In each mission there were also a number of natives appointed for special service, namely, a sacristan, a goat-herd, a tender of the sick, a catechist, a superintendent, a fiscal, and two dirty cooks, one for the missionary and the other for the Californians. Of the fifteen missions, however, there were only four, and these but thinly populated, which could support and clothe all their parishioners, and afford them a home during the whole year. In the other missionary stations, the whole people were divided into three or four bands which appeared alternately once in a month at the mission and encamped there for a week.

Every day at sunrise they all attended mass, during which they said their beads. Before and after mass they recited the Christian doctrine, drawn up for them in questions and answers in their own language. An address or exhortation delivered by the missionary in the same language, and lasting from half an hour to three-quarters of an hour, concluded the religious service of the morning. This over, breakfast was given to those who were engaged in some work, while the others went where they pleased in order to gather their daily bread in the fields, if the missionary was unable to provide them with food. Towards sunset, a signal with the bell assembled them all again in the church to say their beads and the litany of Loretto, or to sing it on Sundays and holidays. The bell was not only rung three times a day, as usual, but also at three o'clock in the afternoon, in honor of the agony of Christ, and also, according to Spanish custom, at eight o'clock in the evening, to pray for the faithful departed. When the week was over, the parishioners returned to their respective homes, some three or six, others fifteen or twenty leagues distant from the mission.

On the principal holidays of the year, and also during passion-week, all members of the community were assembled at the mission, and they received at such times, besides their ordinary food, some head of cattle and a good supply of Indian corn for consumption; dried figs and raisins were also given them without stint in all missions where such fruit was raised. On these occasions, articles of food and apparel were likewise put up as prizes for those who were winners in the games they played, or excelled in shooting at the target.

Fiscals and superintendents, appointed from among the different bands, preserved order within and without the mission. It was their duty to lead all those who were present to the church when the bell rung, and to collect and drive in to the mission that portion of the community which had been roaming for three weeks at large. They were to prevent disorders, public scandals and knaveries, and to enforce decent behavior and silence during church-service. It was further their duty to make the converts recite the catechism morning and evening, and to say their beads in the fields; to punish slight transgressions, and to report more serious offences at the proper place; to take care of those who fell sick in the wilderness, and to convey them to the mission, &c., &c. As a badge of their office they carried a cane which was often silver-headed. Most of them were very proud of their dignity, but only a few performed their duty, for which reason they received their flogging oftener than the rest, and had to bear the blows and cuffs, which it was their duty to administer to others.* There were also catechists appointed upon whom it was incumbent to lead the prayers, and to give instruction to the most ignorant of the catechumens.

Every day, in the morning, at noon, and in the evening, either the missionary himself, or some one appointed by him, distributed boiled wheat or maize to the pregnant women, the blind, old and infirm, if he was unable to feed them all; and for those who were sick, meat was cooked at least once every day. When any work was done, all engaged in it were fed three times a day. Yet their labor was by no means severe. Would to God it had been

* On a preceding page the author gives, not exactly in the proper place, the following particulars concerning the penal law established among the Californians: "In cases of extraordinary crimes, the punishment of the natives was fixed by the royal officer who commanded the Californian squadron; common misdeeds fell within the jurisdiction of the corporal of the soldiers stationed in each mission. Capital punishment, by shooting, was only resorted to in cases of murder; all other transgressions were either punished by a number of lashes administered with a leather whip on the bare skin of the culprit, or his feet put in irons for some days, weeks, or months. As to ecclesiastical punishments, the Roman pontiffs did not think proper to introduce them among the Americans, and fines were likewise out of the question, in accordance with the old German proverb: 'Where there is nothing, the emperor has no rights.'"

possible to make them work like the country people and mechanics in Germany! How many knaveries and vices would have been avoided every day! The work always commenced late, and ceased before the sun was down. At noon they rested two hours. It is certain that six laborers in Germany do more work in six days than twelve Californians in twelve days. And, moreover, all their labor was for their own or their countrymen's benefit; for the missionary derived nothing but care and trouble from it, and might easily have obtained elsewhere the few bushels of wheat or Indian corn which he needed for his own consumption.

For the rest, the missionary was the only refuge of the small and grown, the sick and the healthy, and he had to bear the burden of all concerns of the mission. Of him the natives requested food and medicine, clothing and shoes, tobacco for smoking and snuffing, and tools, if they intended to manufacture anything. He had to settle their quarrels, to take charge of the infants who had lost their parents, to provide for the sick, and to appoint watchers by the dying. I have known missionaries who seldom said their office while the sun shone, so much were they harassed the whole day. Fathers Ugarte and Druet, for instance, worked in the fields, exposed to the hot sun, like the poorest peasants or journeymen, standing in the water and mire up to their knees. Others carried on the trades of tailors and carpenters, masons, brick-burners and saddlers; they acted as physicians, surgeons, organists, and schoolmasters, and had to perform the duties of parents, guardians, wardens of hospitals, beadles, and many others. The intelligent reader, who has so far become acquainted with the condition of the country and its inhabitants, can easily perceive that these exertions on the part of the missionaries were dictated by necessity, and he will, also, be enabled to imagine in what their rents and revenues, in California not only, but in a hundred other places of America, may have consisted.

CHAPTER X.—THEIR LANGUAGE.

The account thus far given of the character and the habits of the Californians will, to a certain extent, enable the reader to form, in advance, an estimate of their language. A people without laws and religion, who think and speak of nothing but their food and other things which they have in common with animals, who carry on no trade, and entertain no friendly intercourse with neighboring tribes, that consist, like themselves, only of a few hundred souls and always remain within their own small district, where nothing is to be seen but thorns, rocks, game, and vermin, such a people, I say, cannot be expected to speak an elegant and rich language. A man of sixty years ran away from my mission with his son, a boy of about six years, and they spent five years alone in the Californian wilderness, when they were found and brought back to the mission. Every one can imagine how and on what subjects these two hermits may have conversed in their daily intercourse. The returned lad, who had then nearly reached his twelfth year, was hardly able to speak three words in succession, and excepting *water, wood, fire, snake, mouse,* and the like, he could name nothing, insomuch that he was called the dull and dumb Pablo, or Paul, by his own countrymen. The story of this boy may almost be applied to the whole people.

Leaving aside a great many dialects and offshoots, six entirely different languages have thus far been discovered in California, namely, the *Laymóna*, about the mission of Loreto; the *Cotshimi*, in the mission of St. Xavier, and others towards the north; the *Utshiti* and the *Pericúa* in the south; the still unknown language spoken by the nations whom Father *Linck* visited in 1766, during his exploration of the northern part of the peninsula; and, lastly, the *Waïcuri* language, of which I am now about to treat, having learned as much of it as was necessary for conversing with the natives.

The Waïcuri language* is of an exceedingly barbarous and rude description, by which rudeness, however, I do not mean a hard pronunciation or a succession of many consonants, for these qualities do not form the essence of a language, but merely its outward character or conformation, and are more or less imaginary, as it were, among those who are unacquainted with it. It is well known that Italians and Frenchmen consider the German language as barbarous, while the Germans have the like opinion of the Bohemian or Polish languages; but these impressions cease as soon as the Frenchmen or Italians can converse in German, and the Germans in the Bohemian or Polish tongues.

In the Waïcuri alphabet the letters *o, f, g, l, x, z* are wanting, also the *s*, excepting in the *tsh*; but the great deficiency of the language consists in the total absence of a great many words, the want of which would seem to render it almost impossible for reasonable beings to converse with each other and to receive instruction in the Christian religion. For whatever is not substantial, and cannot be seen or touched or otherwise perceived by the senses, has no name in the Waïcuri language. There are no nouns whatever for expressing virtues, vices, or the different dispositions of the mind, and there exist only a few adjectives of this class, namely, *merry, sad, lazy,* and *angry,* all of which merely denote such humors as can be perceived in a person's face. All terms relating to rational human and civil life, and a multitude of words for signifying other objects, are entirely wanting, so that it would be a vain trouble to look in the Waïcuri vocabulary for the following expressions: *life, death, weather, time, cold, heat, world, rain, understanding, will, memory, knowledge honor, decency, consolation, peace, quarrel, member, joy, imputation, mind, friend, friendship, truth, bashfulness, enmity, faith, love, hope, wish, desire, hate, anger, gratitude, patience, meekness, envy, industry, virtue, vice, beauty, shape, sickness, danger, fear, occasion, thing, punishment, doubt, servant, master, virgin, judgment, suspicion, happiness, happy, reasonable, bashful, decent, clever, moderate, pious, obedient, rich, poor, young, old, agreeable, lovely, friendly. half, quick, deep, round, contended, more, less, to greet, to thank, to punish, to be silent, to promenade, to complain, to worship, to doubt, to buy, to flatter, to caress, to persecute, to dwell, to breathe, to imagine, to idle, to insult, to console, to live,* and a thousand words of a similar character.†

The word *living* they have neither as a noun nor as a verb, neither in a natural nor a moral sense; but only the adjective *alive. Bad, narrow, short, distant, little,* &c., they cannot express unless by adding the negation *ja* or *ra*‡ to the words *good, wide, long, near,* and *much.* They have particular words for signifying *an old man, an old woman, a young man, a young woman,* and so forth; but the terms *old* or *young* do not exist in their language. The Waïcuri contains only four words for denoting the different colors, insomuch that the natives cannot distinguish in their speech yellow from red, blue from green, black from brown, white from ash-colored, &c.

Now let the reader imagine how difficult it is to impart to the Californians any knowledge of European affairs; to interpret for them some article from a

---

* *Waïcuri.* Father Begert's very curious account of the language is contained on pages 177–194 of the "Nachrichten." It comprises, besides the general remarks on the characteristic features of the language, the Lord's Prayer and the Creed, both with literal and free translations, and the conjugation of a verb.—W. W. T.—*The Literature of American Aboriginal Languages, by Hermann E. Ludewig, with Additions and Corrections, by Professor William W. Turner.* London, 1858, p. 245.

It may be remarked in this place, that the author's name is printed in three different ways, viz: *Beger, Begert,* and *Baegert.* In writing "*Baegert,*" I follow Waitz, who probably gives the correct spelling of the name.

† The author adds: "And all nouns in general that end in German in *heit, keit, niss, ung,* and *schaft.*"

‡ It will hardly be necessary to mention that the Waïcuri words must be pronounced as German. Excepting the *tsch,* which is replaced by the equivalent English sound *tsh,* the orthography of the author has strictly been preserved.

Madrid newspaper, if one happens to be seen in California a year or more after its appearance; or to enlarge upon the merits of the Saints, and to explain, for instance, how they renounced all vanity, forsaking princely possessions and even kingdoms, and distributed their property among the poor; how their lives were spent in voluntary poverty, chastity, and humility; and, further, that they subjected themselves for years to the severest penances, conquered their passions and subdued their inclinations; that they devoted daily eight and more hours to prayer and contemplation; that they disregarded worldly concerns and even their own lives; slept on the bare ground, and abstained from meat and wine. For want of words, the poor preacher has to place his finger to his mouth in order to illustrate eating; and concerning the comforts of life, every Californian will tell him that he never, as long as he lived, slept in a bed; that he is entirely unacquainted with such articles as bread, wine, and beer; and that, excepting rats and mice, he hardly ever tasted any kind of meat.

The above-mentioned and a great many other words are wanting in the Waïcuri language, simply because those who speak it never use these terms; their almost animal-like existence and narrow compass of ideas rendering the application of such expressions superfluous. But concerning *heat* or *cold, rain* or *sickness*, they content themselves by saying, *it is warm, it rains, this* or *that person is sick*, and nothing else. Sentences like the following: "The sickness has much weakened a certain person;" or, "cold is less endurable than heat;" or, "after rain follows sunshine," &c., are certainly very simple in themselves and current among all peasants in Europe, yet infinitely above the range of thought and speech of the Californians.

They cannot express the degrees of relationship, for instance, *father, mother, son, brother*, nor the parts of the human body, nor many other words, such as *word* or *speech, breath, pain, comrade, &c.*, singly and without prefixing the possessive pronouns *my, thy, our, &c.* They say, therefore, *bedáre, edáre, tidre, kepedáre, &c.*, that is, *my, thy, his, our father;* and *hécue, écue, ticue, kepécue*, that is, *my, thy, his, our mother*. So also *mapà, etapà, tapà*, that is, *my, thy, his forehead. Minamù, einamù, tinamù*, that is, *my, thy, his nose; betanía, etanía, tishanía, my, thy, his word*; *menembeú, enembeú, tenembeú, my, thy, his pain, &c.* But no Californian who speaks the Waïcuri is able to say what the words *are, cue, apà, namù, tanía*, and *nembeú*, express, for *father, forehead, word*, or *pain* are significations which they never thought of using in a general sense, and far less has it ever entered their minds to speak, for instance, of the duties of a father, of a gloomy, a serene, a narrow or large forehead, or to make a long, a flat or an aquiline nose the subject of their conversation.

The Waïcuri language is exceedingly deficient in prepositions and conjunctions. Of the first class of words, there exist only two that have a definite application, namely, *tina, on* or *upon*, and *déve* or *tipítsheú*, which is equivalent to the phrase *on account of* or *for* (propter.) The prepositions *out, in, before, through, with, for* (pro,) *against, by, &c.*, are either represented by the words *me, pe*, and *te*, which have all the same meaning, or they are not expressed at all. The article is entirely wanting, and the nouns are not declined. The conjunction *tshie, and*, is always placed after the words which it has to connect; the other conjunctions, such as *that, but, than, because, neither, nor, yet, as, though, &c.*, are all wanting, and likewise the relative pronouns *which* and *who*, so frequently occurring in other languages. They have no adverbs derived from adjectives, and hardly any of the primitive class. The comparative and superlative cannot be expressed, and even the words *more* and *less* do not exist, and instead of saying, therefore, *Peter is taller and has more than Paul*, they have to use the paraphrase, *Peter is tall and has much, Paul is not tall and has not much.*

Passing to the verbs, I will mention that these have neither a conjunctive nor a mandative mood, and only an imperfect optative mood, and that the passive form is wanting as well as the reciprocal verb, which is used in the Spanish and French languages. The verbs have only one mood and three tenses, viz., a present, preterit, and future, which are formed by affixing certain endings to the root of the verb, namely, in the present *re* or *reke;* in the preterit *rikiri, rujére, raúpe,* or *raúpere;* in the future *me, méje* or *éneme.**

Sometimes the natives prefix the syllable *ku* or a *k* alone to the plural of the verb, or change its first syllable into *ku;* for example, *piabakè,* to fight, *umutù,* to remember, *jake,* to chat; but *kupiàbake, kumutù,* and *kuáke,* when they will indicate that there are several persons fighting, remembering, or chatting. A few of their verbs have also a preterit passive participle; for example, *tshipake,* to beat, *tshipitshürre,* a person that has been beaten, plural *kutipaú.* Some nouns and adjectives are likewise subject to changes in the plural number, as, for instance, *ánaï,* woman, *kánaï,* women; *entuditù,* ugly or bad, and *entuditámma,*† bad or ugly women. *Be* expresses *I, me* (mihi,) *me* (me) and *my; ei* means *thou, thee* (tibi,) *thee* (te) and *thy,* and so on through all the personal and possessive pronouns. Yet *becún* or *beticún* signifies also *my,* and *ecún* or *eiticún, thy.*

They know nothing of metaphors, for which reason the phrase *blessed is the fruit of thy womb* in the "Hail Mary" has simply been replaced by *thy child.* On the other hand they are very ingenious in giving names to objects with which they were before unacquainted, calling, for instance, the door, *mouth;* bread, *the light;* iron, *the heavy;* wine, *bad water;* a gun, *bow;* the functionaries of the mission, *bearers of canes;* the Spanish captain, *wild* or *cruel;* oxen and cows, *deer;* horses and mules *titshénu-tshà,* that is, *child of a wise mother;* and the missionary, in speaking of or to him, *tià-pa-tù,* which means *one who has his house in the north, &c.*

In order to converse in such a barbarous and poor language, a European has to change, as it were, his whole nature and to become almost a Californian himself; but in teaching the natives the doctrines of the Christian religion in their own language, he is very often compelled to make use of paraphrases which, when translated into a civilized language, must have an odd and sometimes even ridiculous sound to Europeans; and as the reader may, perhaps, be curious to know a little more of this peculiar language, I will give as specimens two articles from the Waïcuri catechism, namely, *the Lord's Prayer* and the *Creed,* each with a double interpretation, and also the whole conjugation of the verb *amukiri.*‡

Concerning this Californian Lord's Prayer and Creed and their interpretations, the reader will take notice of the following explanatory remarks:

1. The first translation, which stands immediately under the Californian text, is perfectly literal and shows the structure of the Waïcuri language. This version must necessarily produce a bad effect upon European ears; whereas the second translation, which is less literal and therefore more intelligible, may serve to convey an idea how the Waïcuri text sounds to the natives themselves as well as to those who understand their idiom, and have become accustomed, by long practice, to the awkward position of the words, the absence of relative pronouns and prepositions, and the other deficiencies of the language.

* From the conjugation of the verb *amukiri,* given at the end of this chapter, it is evident that these endings have no reference to the person or number of the tenses, but may be indifferently employed.

† This compound word illustrates well the polysynthetic character of the Waïcuri language.

‡ We cannot be too thankful to Father Baegert, who, with all his oddity and eccentricity, has had the philological taste to preserve and explain a specimen of the Waïcuri—a favor the greater, as neither Venegas nor the polished Clavigero has preserved any specimen of a Californian language, much less a verb in full.

2. The words *holy, church, God, ghost, communion, grace, will, cross, virgin, name, hell, kingdom, bread, trespass, temptation, creator, forgiveness, life, resurrection, Lord, daily, Almighty, third, &c.*, are wanting in the Waïcuri language, and have either been paraphrased, when it was feasible, or replaced by corresponding Spanish words, in order to avoid too lengthy and not very intelligible sentences. Some words that could be omitted without materially changing the sense, such as *daily* in the Lord's Prayer, and *Lord* in the Creed, have been entirely dropped.

3. The sentence "he shall come to judge the living and the dead" could not be literally translated, because the Californians are unable to comprehend the moral and theological sense of that passage and others of similar character. Nor could they be taught in the Creed that the flesh will live again, for by "flesh" they understand nothing but the meat of deer and cows. They would laugh at the idea that men were also flesh, and consequently be led to believe in the resurrection of deer and cows, when they were told that the flesh will rise again on the day of judgment.

4. In the Waïcuri language *Heaven* is usually called *aëna*, that is, *the above;* and also, but less frequently, *tekerekádatemba*, which means *curved* or *arched earth* or *land*, because the firmament resembles a vault or arch. *Hell* they have been taught to call *the fire that never expires;* but this expression is not employed in the Waïcuri Creed.

The Lord's Prayer in the Waïcuri language, with a literal translation, showing the exact succession of the words.

Kepè-dáre tekerekádatembà daï, eï-ri akátuikè-pu-me, tshákarrake-
Our Father arched earth thou art, thee O! that acknowledge all will, praise
pu-me ti tshie: ecùn *graciu*—ri atûme catè tekerekádatembà tshie; ei-
all will people and: thy grace O! that have will we arched earth and; thee
ri jebarrakéme ti pù jaûpe datembà, páe eï jebarrakére, aëna kéa; kepecùn búe
O! that obey will men all here earth, as thee obey, above are; our food
kepe kên jatûpe untáiri; cate kuitsharrakè têi tshie kepecùn atacámara, pàe kuitsharrakère
us give this day; us forgive thou and our evil, as forgive
catè tshie cávape atukiàra kepetujakè; catè tikakambà têi tshie cuvumerà catè uê
we also they evil us do; us help thou and desire will not we anything
atukiàra; kepe kakunjà pe atacára tshie. *Amen.*
evil; us protect from evil and. Amen.

The same in a less literal translation.

Our Father, Thou art in the Heaven; O that all people may acknowledge and praise Thee! O that we may have Thy grace and Heaven! O that all men may obey Thee here in the world as obey Thee who are above! Our food give us on this day, and forgive us our sins, as we also forgive those who do us harm; and help us that we may not desire anything sinful, and protect us from evil. Amen.

The twelve articles of the Creed literally translated.

Irimánjure pò *Dios* Tiare uretî-pu-puduéne, tàupe me buarà uretírikíri
I believe in God his Father make all can, this of nothing has made
tekerekádatembà atembà tshie. Irimánjure tshie pe *Jesu Christo* titshánu íbe te
arched earth earth and. I believe also in Jesus Christ his son alone —
tiáre, éte punjére pe *Espiritu Santo*, pedára tshie me *Santa Maria virgen*.
his father's, man made by Holy Ghost, born and of Saint Mary virgin.
Irimánjure tshie tâu-vérepe *Jesu Christo* híbitsherikíri tenembeû apánne iebitshéne
I believe also this same Jesus Christ suffered has his pain great commanding
témme pe *Judea Pontio Pilato;* kutikûrre rikiri tína *cruz*, pibíkíri, kejenjûta rikíri
being in Judea Pontius Pilate; extended been on cross, has died, under earth buried is
tshie; keritshéu atembà búnju; meakúnju untáiri tipè-tshetahutipè rikíri; tshukíti
also; gone down earth below; three days alive again has been; gone up
tekerekádatembà, penekà tshie me titshuketà te *Dios* tiâre uretî-pu-puduéne,
arched earth, sits also his right hand of God his father make all can,

aipúreve tenkíe uteürî-ku-mẽje atacámma atacámmara ti tshie. Irimánjure pe
from thence reward give come will good bad men also. I believe in
Espíritu Santo; irimánjure epî *Santa Iglesia catholica, communion* te kunjukarâu
Holy Ghost; I believe there is Holy Catholic Church, communion — washed
ti tshie. Irimánjure kuitsharakéme *Dios* kumbáte-didî-re, kutéve-didî-re ti tshie
people also. I believe forgive will God hate well, confess well men and
kieûn atacámmara pánne pu. Irimánjure tshie tipè tshetshutipé me tibikíu ti pù;
their bad great all. I believe and alive again will be dead people all:
enjéme tîpe dêi méje tucáva tshie. *Amen.*
then alive ever will be the same also. Amen.

The same less literally translated.

I believe in God the Father, who can make everything; he has made of nothing Heaven and earth. I believe also in Jesus Christ, the only Son of his Father; was made man by the Holy Ghost; was born of the Virgin Mary. I believe also this same Jesus Christ suffered great pain while Pontius Pilate was commanding in Judea: he was extended on the cross; he died and was buried; he went below the earth; he became alive again in three days; he went up to Heaven; he sitteth at the right hand of God his Father, who can make everything; he will come from thence to give rewards to the good and bad. I believe in the Holy Ghost; I believe there is a Holy Catholic Church and communion of the baptized. I believe God will forgive those men who thoroughly hate and thoroughly confess all their great sins. I believe also all dead men will become alive again, and then they will be always alive. Amen.

CONJUGATION OF THE VERB AMUKÍRI, TO PLAY

Present.

Sing.	bè	I	play, &c.
	eî	thou	amukiri—re
	tutaû	he	
Plur.	catè	we	
	petè	you	
	tucáva	they	

Preterit.

Sing.	bè	I	have played, &c.
	eî	thou	amukiri—rikíri
	tutaû	he	—rujére
Plur.	catè	we	*or* —râupe
	petè	you	—râupere
	tucáva	they	

Future.

Sing.	bè	I	will play, &c.
	eî	thou	amukiri—me
	tutâu	he	—méje
Plur.	catè	we	*or* —éneme
	petè	you	
	tucáva	they	

Imperative.

Sing. amukiri tei, play thou.
Plur. amukiri tu, play you.

Optative.

Sing.	bè—ri	amukiri—rikirikára *or*—rujerára	Would to God, I, thou, he, we, you, they had not played!
	ei—ri		
	tutâu—ri		
Plur.	catè—ri		
	petè—ri		
	tucáva—ri		

APPENDIX.

*Note on the Cora and Vaicuri languages, by Francisco Pimentel.**

Father Ortega refers in various places to the grammar of the Cora language which he intended to write; but the work, if it was ever written, has been lost, since there is no mention of it, and it is unknown to bibliographers.

The Cora dialect is known also by the names of Chora, Chota, and Nayarita. This last name comes from the fact that it was spoken, and is still so, in the mountains of Nayarit in the State of Jalisco. There is another idiom called Cora in California, which is a dialect of the Guaicura or Vaicura, differing from that spoken in Jalisco. I have compared various words of the Guaicura and the Cora of Jalisco, and have found them entirely different.

Examples.

	Cora.	Vaicura.
Father	Tiyaoppa	Are.
Thou art	Petehbe	Daí.
All	Manaicmic	Pu.
Man	Tevit	Ti.
And	Aeta	Tschie.
Here	Yye	Taupe.
Earth or world	Chianacat	Datemba.
Above	Mehtevi	Aena.
Food	Gueahti	Bue.
To give	Ta	Ken.
Day	Xeucat	Untairi.
To pardon	Ataouniri	Kuitscha.
How	Eupat	Pae.
Obedient	Teatzahuatcacame	Tebarrakere.
No	Ehe	Ra.
Something	Titac	Ue.
I	Neapue, nea	Be.
Thou	Apue, ap	Eí.
He	Aehpu, aehp	Tutau.
We	Ytean	Cate.
You	Ammo, an	Peti.
They	Aehmo, aehm	Tucava.
My	Ne	Be, me, mi, m.
Thy	A	Ei, e, et.
His	Ana, hua	Ti, te, t.
Our	Ta	Kepe.
For	Keme	Deve.
Upon	Apoan	Tina.
Game	Muaitec	Amukiri.
Son	Tiperie, tiyaoh	Tschanu.
Nose	Tzoriti	Namu.

NOTE RELATIVE TO THE AUTHOR.—The only facts concerning the author, which I was able to obtain while engaged in translating his work, are contained in *De Backer's Bibliothèque des Ecrivains de la Compagnie de Jésus, Liège* 1859. Vol. v, p. 28.

The author, whose name is given here as Jacob *Begert*, was born (1717) at Schlettstadt (Upper Rhine.) He went to California in 1751 and preached the Gospel there till the decree of Charles III tore the Jesuits from their missions. On returning to Europe, he retired to Neuburg in Bavaria, where he died in the month of December, 1772. Clavigero stands as authority for ascribing the "Nachrichten" to him, and it is also mentioned that the "Berlin'sche litterarische Wochenblatt," (1777, vol. ii, p. 625,) contains an extract of the work. Meusel's large work on German authors, entitled "Das golehrte Deutschland," is given as the source from which these statements are derived.

The "Nachrichten" appeared first in print in 1772, the same year in which the author died, who consequently could have survived the publication of his work only a short time. The copy in my hands, which was printed in 1773, is not properly a second edition, but merely a reprint, in which the most glaring typographical errors are corrected.

* Boletin de la Sociedad Mexicana de Geografia y Estadistica. Mexico, 1862, tomo viii, num. 11, p. 603, &c.

AGRICULTURAL IMPLEMENTS

OF THE

NORTH AMERICAN STONE PERIOD.

BY CHARLES RAU, OF NEW YORK.

My collection of Indian stone implements contains a number of specimens remarkable alike for large size and superior workmanship, which, to all appearance, have been used for agricultural purposes by the aborigines of this country; and, as no description of similar relics has appeared as yet in any modern work on North American ethnology or antiquities, a notice thereof might be acceptable to all who take an interest in the former condition of the aboriginal inhabitants of North America.

The implements in question are of two distinct forms, represented in the woodcuts, figures 1 and 2, and may be classified, from their shape and probable application, as *shovels* and *hoes*. The material from which they are chipped, and which I never succeeded in discovering *in situ*, is invariably a very hard flint of a bluish, gray, or brownish color, and a slightly conchoidal fracture, and quite unlike that variety of flint of which the arrow and spear heads occurring in the west are usually made.

Fig. 1.

Fig. 2.

Fig. 1 represents one of the shovels in my possession. Like all other specimens of this kind, it is an oval plate, flat on one side and slightly convex on the other, the outline forming a sharp edge. It measures above a foot in length, a little more than five inches in its greatest breadth, and is about three-quarters of an inch thick along the longitudinal diameter. The workmanship exhibits an admirable degree of skill. Besides the specimen just described, which was discovered in a field near Belleville, St. Clair county, Illinois, I possess two others of similar shape and workmanship. The one of these last named I found myself within sight of the celebrated Cahokia temple-mound in Illinois, in the construction of which it may have assisted centuries ago; the other was dug up in 1861 in St. Louis, while earthworks were built by order of General Frémont for the protection of the city against an apprehended attack of the southern secessionists. When attached to solid handles, these stone plates certainly constituted very efficient digging implements.

Fig. 2 illustrates the shape of a hoe. This specimen, which was obtained from a burial-mound near Illinoistown, opposite St. Louis, is seven and a half inches long, nearly six inches wide, and about half an inch thick in the middle; the round part is worked into a sharp edge. Another specimen of my collec-

tion, of equal workmanship but inferior in size, was found, after a heavy rain, in a garden in the city of Belleville. The fastening to a handle was facilitated by the two notches in the upper part, and, in order to constitute a hoe, the handle was doubtless attached in such a manner as to form a right or even an acute angle with the stone plate.

If the shape of the described implements did not indicate their original use, the peculiar traces of wear which they exhibit would furnish almost conclusive evidence of the manner in which they have been employed; for that part with which the digging was done, appears, notwithstanding the hardness of the material, perfectly smooth, as if glazed, and slightly striated in the direction in which the implement penetrated the ground. This peculiar feature is common to all specimens of my collection, and also to the few which I have seen in the possession of others. They seem to be rather scarce, and merely confined to the States bordering on the Mississippi river. Dr. E. H. Davis, of New York, has none of them in his excellent and comprehensive collection of Indian relics, and, consequently, does not describe or represent them in his work on the "Ancient Monuments of the Mississippi Valley," forming the first volume of the Smithsonian publications; nor am I aware that Mr. Schoolcraft has mentioned them in his large work on the North American races.

A passage in the "History of Louisiana," by Du Pratz, possibly refers to the implements described by me as hoes. In speaking of the agricultural pursuits of the Indians of Louisiana, that author observes, they had invented a hoe, (pioche,) with the aid of which they prepared the soil for the culture of maize. "*These hoes,*" he says, "*are shaped like a capital L; they cut with the edge of the lower part, which is entirely flat.*"* It is true, he does not mention of what material this "lower part" consisted, but we may safely infer that it was stone, the substance from which the aborigines of North America manufactured nearly all their implements of peace and war. They had no iron, and the scanty supplies of native copper, derived from the region of Lake Superior, were almost exclusively used for ornamental purposes.

The fact itself that simple agricultural utensils of Indian origin are occasionally met with is by no means surprising, for we know from the accounts of the early writers that many of the North American tribes raised maize and a few other nutritious plants before the arrival of the Europeans on this continent. Maize was, however, their principal produce, and that on which they mainly depended. In describing the ill-fated Mississippi expedition of De Soto, Garcilaso de la Vega speaks repeatedly of the extensive maize fields of those Indian tribes through whose territories that band of hardy adventurers passed. During an invasion of the country of the Senecas, made as early as 1687 under the Marquis de Nonville, all their Indian corn was burned or otherwise spoiled, and the quantity thus destroyed is said to have amounted to 400,000 minots, or 1,200,000 bushels.† It is even asserted by Adair, that the colonists obtained from the Indians "different sorts of beans and peas with which they were before entirely unacquainted."‡

From these and other facts, which need not be cited in this place, we learn that the North American Indians generally, though warriors by disposition and hunters by necessity, had, nevertheless, already made some steps towards an agricultural state. But the events that happened after the arrival of the whites, instead of adding to their improvement, served only to lower their condition, and reduced them, finally, to the position of strangers in their own land.

---

* Ces pioches sont faites comme une L capitale; elles tranchent par les côtés du bout bas qui est tout plat.—*Histoire de la Louisiane*, par M. Le Page du Pratz, (Paris, 1758,) vol. ii, p. 176.

† Documentary History of New York, vol. i, p. 238. This estimate may be somewhat exaggerated.

‡ The History of the American Indians, by James Adair, (London, 1775,) p. 408.

ARTIFICIAL SHELL-DEPOSITS IN NEW JERSEY.

BY CHARLES RAU, OF NEW YORK.

It has frequently been observed that there exists a certain resemblance between archæology and geology, notwithstanding the different character of the results obtained by these sciences, and the parallelism which they exhibit is really of sufficient distinctness to justify a comparison. By examining the petrified remains of animals and plants that are found in the layers composing the crust of the earth the geologist determines the different phases in the history of our planet; while the student of archæology, in endeavoring to throw light on the former condition of mankind, has to rely in a great measure on the ruins of buildings, on earthworks, implements of various kinds, organic remains, and other traces left by those who passed away long ago from the scene of life But even in the results of the two sciences the analogy is not entirely wanting, in so far as the geologist, though succeeding in establishing the relative age of the strata, is unable to determine with any degree of certainty the time that was required to form the stony shells surrounding our globe; and in treating of ante-historic periods, the archæologist, likewise, is at a loss to fix the period when a people existed, of whose conditions of life, manners, and domestic habits he can give the most satisfactory account. I will mention in this place only two recent discoveries in archæology, namely, the *lacustrine villages* of Switzerland, Italy, and Germany, and the *Kjoekkenmoeddings* or *refuse-heaps* occurring on the Danish islands. In both cases we obtain, by the minute researches and ingenious conclusions of scientific investigators, a knowledge of certain populations concerning whom history is entirely silent; and while we have become acquainted with their character and manner of living, we neither know their names, nor are we able to determine the period when they inhabited those places which abound with tokens of their former existence. The lake-dwellings as well as the *Kjoekkenmoeddings* have been described in the Smithsonian publications* and elsewhere, and it would be useless to enlarge here on these subjects; but as I intend in this sketch to treat of American remains similar to the *Kjoekkenmoeddings*, I will merely devote a few words to the latter memorials of antiquity. On the coasts of the Danish islands and along the fjords of Jütland there occur extensive heaps of shells, mostly of the oyster, which were considered for a long time as formations of the sea, until of late their artificial character was established by Danish savans, who proved them to be the accumulated refuse of the repasts of a people that dwelt in former ages, beyond the record of history, on the shores of these islands.

The indications of the artificial origin of these shell-heaps chiefly consist in a total absence of stratification which always characterizes marine deposits, and in the fact that the rubbish contains rude flint implements, fragments of coarse pottery, fireplaces, charcoal, cinders, and the bones of various animals, some of which are now extinct in those parts, as for instance the urus, *(Bos urus* or *primigenius,)* beaver, and auk or penguin, *(Alca impennis, Lin.)* But neither bronze nor iron has been discovered in these places, from which it may be inferred that the inhabitants were unacquainted with the use of metals, and

* Annual Smithsonian Reports for 1860 and 1861.

belonged to that remote period which is called "the age of stone" by the archæologists of Europe.

From the islands of the Baltic sea I will now turn to the shores of New Jersey.

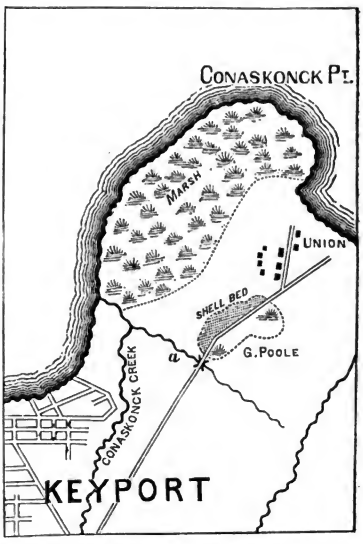
While spending, during the summers of 1863 and 1864, some weeks at Keyport, Monmouth county, New Jersey, a small town situated on Raritan bay, I examined within the precincts and in the neighborhood of that place several shell-deposits which are unmistakably artificial and the memorials of the Indians who formerly inhabited this region.* These deposits evidently owe their origin to the same causes which produced the Danish *Kjoekkenmoeddings*, to which they correspond in all essential points, constituting accumulations of cast-away shells, which sometimes merely form a more or less dense covering of the sandy surface, but also in a few instances beds or layers intermingled with sand and pebbles, in which case they assume the shape of irregular hillocks or mounds.

The shell-deposits of Keyport indicate the places where the aborigines were accustomed to feast upon the spoils of the neighboring beach, remarkable for its abundance of oysters, clams, and other eatable mollusks. They selected for this purpose favorably situated localities at some distance from the shore, and sufficiently elevated to be out of reach of high tide; and in a few cases that fell under my notice, the shell-beds are contiguous to creeks which run into the beach and probably afforded the means of transporting the supply of shell-fish in canoes from the sea directly to the place of encampment. The principal food of the aboriginal coast-population was evidently furnished by the common oyster *(Ostrea borealis, De Kay)* and the hard-shell clam *(Venus mercenaria, Lin.)* for their valves, partly very old and frequently broken, constitute almost entirely these accumulations of shells; but the common periwinkle *(Pyrula canaliculata* and *P. carica, De Kay)* is also often met, and was probably eaten by the aborigines, as it is at present by some of their Caucasian successors. I found only two or three specimens of the soft-shell clam *(Mya arenaria, Lin.)* among the shell-heaps, and none of the common black mussel *(Mytilus edulis, Lin.)* The last-named species, however, does not occur in great numbers in the neighborhood of Keyport, and the soft-shell clam has, as its name indicates, very thin and perishable valves, the fragments of which may lie buried among the thicker and more durable shells of the other mollusks. It would be rash, therefore, to suppose the soft-shell clam had been excluded from the bill of fare of the Indians. Among these remains of mollusks the broken bones of animals are occasionally met with, though generally in such an advanced state of decay that their character can no longer be determined; for, owing to the non-conservative quality of the sand which surrounds them, they have become entirely destitute of animal matter, and will almost crumble to pieces when handled for examination. The direct evidences of the occupancy of these places by the Indians are not wanting, and consist of numerous fragments of pottery and stone implements of the usual kind, otherwise very scarce in this part of New Jersey.

By far the most extensive shell-bed I had an opportunity to examine occurs on the farm of Mr. George Poole, situated a mile and a half northeast of Keyport, and about three quarters of a mile south of a small projection of the coast known as Conaskonck Point. The road leading from Keyport to the village of Union passes through the farm lands, which occupy an area of ninety acres. This locality was doubtless for many generations the abiding place, or at least the periodical resort, of the Indians, and traces of their former presence in the

* My attention was first directed to these aboriginal remains by the Rev. Samuel Lockwood, a scientific gentleman of Keyport, who had recognized their true character before I made any investigations.

shape of cast-away shells, arrow-points, and broken pottery, may be discovered almost in every field belonging to the farm. Their principal camping-ground, however, was situated close to the road already mentioned, and is indicated by the dark dotted space on the accompanying plan. Here we have a *Kjoekkenmoedding* in the real sense of the word. Seen from a distance, this place has almost the appearance of a snow-covered field, owing to the great number of bleached shells constituting this deposit, which spreads over an area of six or seven acres and forms several extensive heaps or mounds of an average height of about five feet. But these heaps do not exclusively consist of shells: the latter are mostly imbedded in sand, probably carried thither by the action of winds—by æolic action, as science calls it—and intermingled with innumerable pebbles representing various mineral substances, among which those of the quartz family seem to predominate. As in other localities of the neighborhood, the shells on this spot are the remains of oysters, hard-shell clams, and periwinkles, the last-named kind of shell-fish being represented, as elsewhere, by a comparatively small number of specimens.



That considerable time was required to heap up these shells is evident, and, moreover, indicated by the chalky, porous appearance and fragility of many of the valves, while those that were cast away at later periods exhibit these signs of decay in a far less degree, and are even sometimes as sound as though they had but lately been left on the shore by high water. A great number of the shells are broken, especially those of clams, which seem to be more brittle than oyster shells. This breaking into fragments is caused by the sudden changes of temperature, in consequence of which the valves crack and ultimately fall to pieces. Concerning the depth of this deposit, I learned that about twelve years ago several hundred loads of shells were taken away from a certain spot for making a road. The excavation thus produced reached about eight feet downward, and the mass was found to consist throughout that depth of shells, sand, and pebbles. My own diggings, which were, however, of a more superficial character, led to the same result. This shell-bed is about half a mile distant from the shore at low tide, and the intervening area consists chiefly of so-called salt-meadow. In transporting the shell-fish to the camping place it is probable that the aborigines availed themselves of a small nameless creek (marked *a* on the plan) running towards the sea, west of the shell-bed, and not very distant from it. This creek, though rather narrow, is sufficiently deep for canoe navigation during high water, and joins the more considerable Conaskonck creek, which flows into the beach. There was, consequently, a water connexion between the sea and the camp. The space enclosed by a dotted line on the accompanying plan indicates the continuation, or rather the running out, of the shell-bed just described; for here the shells

are by far less numerous, and form no longer heaps, but lie thinly scattered over the ground, which is partly under cultivation, and swampy in some places, as marked in the drawing, by which it is only intended to show approximately the location and extent of the deposit.

By searching among these shell-heaps and in the adjacent fields I obtained more than three hundred specimens of Indian manufacture, consisting of stone axes, arrow and spear-points of different shapes, flint knives, and many pieces of broken crockery. The tomahawks, which consist of greenstone or sandstone, are of the usual shape, and encircled with a groove for attaching them to a handle. The material of the arrow and spear-heads is either flint, common quartz, greenstone, or a kind of dark slate. The specimens made of the two last-named mineral substances have a rather clumsy appearance, owing to the roughness of the material; but those wrought of flint are mostly well shaped and present pretty good samples of aboriginal art. That the manufacture of arrow-heads was carried on in this place is evident from the great number of flint chips which lie scattered among the shells; and, moreover, I picked up several unfinished arrows, which were thrown aside as useless in consequence of a flaw or wrong crack, or some other irregularity in the material. These specimens are in so far interesting as they illustrate the process of arrow-making. The fragments of pottery which I collected here consist of a dark clay, either mixed with coarse sand, or pure, and for the most part rather slightly burnt; some of the sherds still bear the ornamental lines and notches cut in the surface of the vessels. The mixing of the clay with pounded shells does not seem to have been practised by the Indians of this region. I found also a fragment of an apparently large vessel cut out of a talcose stone. A few clay beads were picked up on the spot, but I did not obtain any of them.

The last Indians who visited periodically the neighborhood of Keyport, even within the recollection of old people, belonged, according to the statement of my informant, to the tribe of Narragansetts. They made their appearance every year and caught shell-fish, which they dried for winter use. Their encampment, however, was not on the spot of which I have given a description, but in Pleasant Valley, a little less than four miles south of Keyport.

I am informed that similar shell-beds occur on Long Island, where the neighboring farmers use the shells for burning lime. Two centuries and a quarter ago the Dutch colonists of Manhattan island made the same use of the shells heaped up by the Indians of that locality. The account of New Netherland given by the Jesuit missionary Isaac Jogues, contains the following passage relative to the subject:

"There are some houses built of stone; lime they make of oyster shells, great heaps of which are found here, made formerly by the savages, who subsist in part by that fishery." *

Sir Charles Lyell saw on St. Simon's island, near the mouth of the Altamaha river, in Georgia, large Indian shell-mounds, of which he gives the following description:

"We landed on the northeast end of St. Simon's island, at Cannon's Point, where we were gratified by the sight of a curious monument of the Indians, the largest mound of shells left by the aborigines in any one of the sea islands. Here are no less than ten acres of ground, elevated in some places ten feet, and on an average over the whole area five feet, above the general level, composed throughout that depth of myriads of cast oyster shells, with some mussels, and here and there a modiola and helix. They who have seen the Monte Testaceo,

* Memoir of a Captivity among the Mohawk Indians, a Description of New Netherland in 1642-'43, and other Papers, by Father Isaac Jogues, of the Society of Jesus, with a Memoir of the Author, by John Gilmary Shea, (New York, 1857,) p. 57. In the original the passage runs thus: "Il y a quelques logis bastys de pierre; ils font la chaux avec des coquilles d'huistres dont il y a de grans monceaux faits autrefois p les sauvages, qui vivent en partie de cette pesche."

near Rome, know what great results may proceed from insignificant causes where the cumulative power of time has been at work, so that a hill may be formed out of the broken pottery rejected by the population of a large city. To them it will appear unnecessary to infer, as some antiquaries have done, from the magnitude of these Indian mounds, that they must have been thrown up by the sea. In refutation of such an hypothesis, we have the fact that flint arrow-heads, stone axes, and fragments of Indian pottery have been detected throughout the mass." *

The same author noticed shell-deposits on the coasts of Massachusetts.

During his voyage round the world Mr. Darwin saw shell-heaps in the island of Tierra del Fuego. He says:

"The inhabitants, living chiefly upon shell-fish, are obliged constantly to change their place of residence; but they return at intervals to the same spots, as is evident from the piles of old shells, which must often amount to many tons in weight. These heaps can be distinguished at a long distance by the bright green color of certain plants which invariably grow on them." †

We may expect to meet with artificial shell-accumulations, or at least traces of them, almost in all parts of the American coasts where an aboriginal population existed, and they have already been found in various places besides those mentioned, as for instance in Newfoundland and in California, and we shall doubtless hear of further discoveries as soon as proper attention is paid to these memorials of the native inhabitants of the American continent.

The occurrence of the Danish refuse-heaps, whose age is lost in the dawn of history, and of similar comparatively recent deposits in America, shows that the conditions of existence of those Baltic islanders and the American coast inhabitants were essentially the same, and furnishes a striking illustration of the similarity in the development of man in both hemispheres. A thorough investigation of the American shell-mounds will not only enable us to compare them more minutely with the corresponding remains of Europe, but may, possibly, disclose important facts relative to the former condition of the American race, and thus enlarge our stock of ethnological knowledge.

---

* A Second Visit to the United States of America, by Sir Charles Lyell, (New York, 1849,) vol. i, p. 252.

† Journal of Researches, &c., by Charles Darwin, (New York, 1846,) vol. i, p. 272.

INDIAN POTTERY.

BY CHARLES RAU.

In former times, when the aboriginal inhabitants of this country were still in possession of their own lands, and their mode of living had not been changed by the intrusion of the pale-faced Caucasian, the art of pottery was practised by them to a considerable extent. This branch of industry lost, however, much of its importance among the Indians so soon as they discovered the superiority of the vessels of metal, which they obtained in trafficking with the whites, and the durable kettle of iron or copper soon replaced the fragile and far less serviceable cooking utensil of clay. The beginning of the decline of this aboriginal art is, therefore, of an early date, and at the present time it may be considered as almost, if not entirely, extinct among the tribes still inhabiting the territory of the United States, excepting some in New Mexico and Arizona, who have not yet abandoned the manufacture of earthenware. As late as 1832, when Mr. Catlin visited the nations of the Upper Missouri, he found the Mandans still diligently practising the ceramic art; but the ravages of the small-pox have reduced their number to a few, and it is probable that vessels of clay are no longer made in those regions.

The Iroquois, of New York, those survivors of the once powerful Confederation who have escaped the fate of being driven toward the setting sun, and are still permitted to dwell upon their native soil, have ceased long ago to fabricate earthen vessels. So I am informed by Dr. Peter Wilson, De-jih-non-da-weh-hoh, grand chief of the Six Nations of New York. "The manufacture of pottery," says my correspondent, "has long since been discontinued among our people; like most other utensils, clay vessels have been superseded by utensils of the manufacture of the race who introduced among us the implements which are more durable and convenient. Such implements and other articles used among us only remain, or are being manufactured, as are not superseded by articles which the ingenuity of the pale face replaces." The same remark can probably be applied to the other tribes east of the Rocky Mountains.

That the fabrication of earthenware was once carried to a great extent among the Indians, is shown by the great number of sherds which lie scattered over the sites of their former villages and on their camping places; but they are, perhaps, nowhere in this country more numerous than in the "American Bottom," a strip of land which extends about one hundred miles along the Mississippi, in Illinois, and is bounded by the present bank of that river and its former eastern confine, indicated by a range of picturesque wooded hills and ridges, commonly called the "Bluffs." This bottom, which is on an average six miles wide and very fertile, was formerly the seat of a numerous indigenous population, and abounds in tumular works, cemeteries, and other memorials of the subdued race. Among the lesser relics left by the former occupants may be counted the remnants of broken vessels, which occur very abundantly in various places of this region. These fragments are, however, mostly small; and, according to my experience, entire vessels are not found on the surface, but frequently in the ancient mounds and cemeteries, where they have been deposited with the dead as receptacles for food, to serve on their journey to the happy land of spirits.

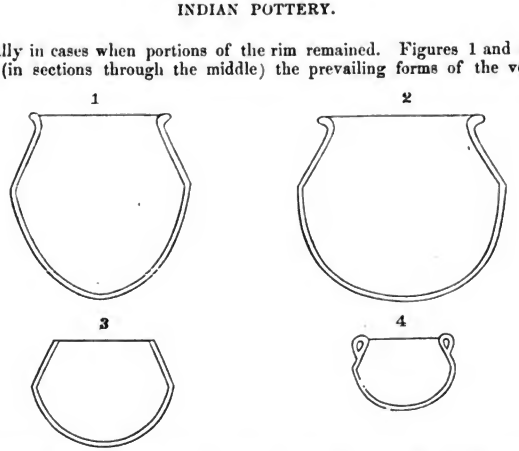
About six years ago, while living in the west, I was much gratified by the discovery of a place in the American Bottom where the manufacture of earthenware was evidently carried on by the Indians. The locality to which I allude is the left bank of the Cahokia creek,* at the northern extremity of Illinoistown, opposite St. Louis. At the point just mentioned the bank of the creek is somewhat high and steep, leaving only a small space for a path along the water. When I passed there for the first time, I noticed, scattered over the slope or protruding from the ground, a great many pieces of pottery of much larger size than I had ever seen before, some being of the size of a man's hand, and others considerably larger; and, upon examination, I found that they consisted of a grayish clay mixed with pounded shells. A great number of old shells of the *unio*, a bivalve which inhabits the creek, were lying about, and their position induced me to believe that they had been brought there by human agency rather than by the overflowing of the creek. My curiosity being excited, I continued my investigation, and discovered at the upper part of the bank an old fosse, or digging, of some length and depth, and overgrown with stramonium or jimson weed; and upon entering this excavation, I saw near its bottom a layer of clay, identical in appearance with that which composed the fragments of pottery. The excavation had unmistakably been dug for the purpose of obtaining the clay, and I became now convinced beyond doubt that the fabrication of earthen vessels had been carried on by the aborigines at this very spot. All the requisites for manufacturing vessels were on hand; the layer of clay furnished the chief ingredient, and the creek not only supplied the water for moistening the clay, but harbored also the mollusks whose valves were used in tempering it. Wood abounded in the neighborhood. All these facts being ascertained, it was easy to account for the occurrence of the large fragments. Whenever pottery is made, some of the articles will crack during the process of burning, and this will happen more frequently when the method employed in that operation is of a rude and primitive character, as it doubtless was in the present case. The sherds found at this place may, therefore, with safety be considered as the remnants of vessels that were spoiled while in the fire, and thrown aside as objects unfit for use.

I did not succeed in finding the traces of a kiln or fireplace, and it is probable that the vessels were merely baked in an open fire, of which all vestiges have been swept away long ago. The occurrence of the broken pottery was confined to a comparatively small area along the bank, a space not exceeding fifty paces in length, as far as I can recollect. They were most numerous in the proximity of the old digging, and at that place quite a number of them were taken out of the creek into which they had fallen from the bank. Farther up the creek I saw another excavation in the bank, of much smaller dimensions, and likewise dug for obtaining clay. Among the shells and sherds I noticed many flints which had obviously been fashioned to serve as cutting implements; they were, perhaps, used in tracing the ornamental lines on the vessels or in smoothing their surfaces.

I did not find a single complete vessel at this place, but a great variety of fragments, the shape of which enabled me to determine the outline of the utensils of which they originally formed parts. This was not a very difficult matter.

* This creek runs in a southwardly direction through Madison county and a part of St. Clair county, and empties into the Mississippi four miles below St. Louis, near the old French village of Cahokia.

especially in cases when portions of the rim remained. Figures 1 and 2 represent (in sections through the middle) the prevailing forms of the vessels



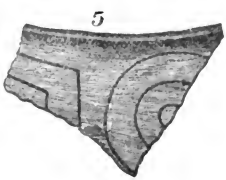
The rim, it will be seen, is formed into a lip and turned over, in order to facilitate suspension; sometimes, however, it is cut off abruptly, as in Fig. 3. Some of the vessels—more especially the smaller ones—were provided with ears, like Fig. 4;* others had the outer rim set with conical projections or studs, both for convenience and ornament; and a few of the fragments exhibit very neatly indented or notched rims. In size these vessels varied considerably; some measured only a few inches through the middle, while the largest ones, to judge from the curvature of the rims, must have exceeded *two feet in diameter*. The bottom of the vessels mostly seems to have been rounded or convex. I found not a single flat bottom-piece. This, however, may be merely accidental, considering that flat-bottomed vessels were made by the Indians. The appearance of the fragments indicates that the earthenware was originally tolerably well burned, and the fracture exhibits in many instances a reddish color. But, as the art of glazing was unknown to the manufacturers, it is no wonder that the sherds, after having been imbedded for many years in the humid ground, or exposed to rain and the alternate action of a burning sun and a severe cold, are now somewhat brittle and fragile; yet, even when new, this aboriginal earthenware must have been much inferior in compactness and hardness to the ordinary kind of European or American crockery.

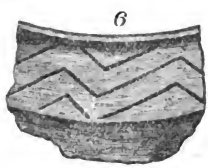
The thickness of the fragments varies from one-eighth to three-eighths of an inch, according to the size of the vessels, the largest being also the strongest in material. But in each piece the thickness is uniform in a remarkable degree; the rims are perfectly circular, and the general regularity displayed in the workmanship of these vessels renders it almost difficult to believe that the manufacturers were unacquainted with the use of the potter's wheel. Such, however, was the case. I have already mentioned that the clay used in the fabrication of this earthenware is mixed with coarsely pulverized unio-shells from the creek; only a few of the smaller bowls or vases seem to consist of pure clay. The vessels were covered on the outside, and some even on both sides, with a thick coating of paint, either of a black, dark brown, or beautiful red color, and

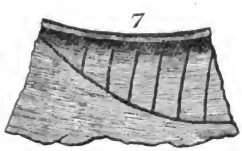
* I possess a small food vase of this shape, which was taken out of an old Indian grave on the "Bluffs," near French village, six or seven miles east of Illinoistown. It was, perhaps, made at the very place which I have described.

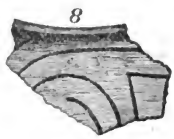
in some fragments the latter still retains its original brightness. Only *one* color, however, was used in the painting of each article. It is evident that the coloring preceded the process of baking, and the surfaces thus coated are smooth and shining, the paint replacing to a certain extent the enamel produced by glazing.

That the aboriginal potters on the Cahokia creek did not neglect the decorative art in their manufactures, is shown by the ornamental lines traced on the surface of their crockery. The simplest form of ornamentation consists in straight lines running around the vessel parallel to the rim; but they employed also other combinations of lines, of which figures 5, 6, 7, and 8 are examples. In some instances


5

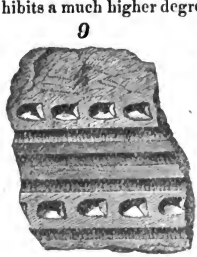

6


7


8

the *inside* only was ornamented. The lines are mostly drawn with great regularity, and sometimes one-eighth of an inch wide, with a corresponding depth. I obtained, however, from the deposit at the Cahokia creek one small fragment, which exhibits a much higher degree of skill in the art of decoration than any of the others found at the same place. Figure 9 represents it in full size. This specimen is about three-sixteenths of an inch thick, and consists of clay with an admixture of pulverized granite, the components of which—quartz, feldspar, and mica—can be plainly distinguished in the fracture. It is well baked and of a light-gray color. The ornamental lines and notches are impressed, or, perhaps, scooped out, with the greatest accuracy, and the vessel, when complete, must have presented a very good specimen of aboriginal ceramic art. Whoever compares the annexed drawing with Fig. 5 on Plate 46 of the "Ancient Monuments of the Mississippi Valley," by Squier and Davis, will find that the originals of the representations are nearly alike in point of ornamentation. The latter drawing delineates a part of a vase found in one of the ancient mounds of Ohio. Having seen the best specimens of "mound" pottery obtained during the survey of Messrs. Squier and Davis, I do not hesitate to assert that the clay vessels fabricated at the Cahokia creek were in every respect equal to those exhumed from the mounds of the Mississippi valley, and Dr. Davis himself, who examined my specimens from the first-named locality, expressed the same opinion.

9



One of the methods employed by the Indians in the manufacture of earthenware was, to weave baskets of rushes or willows, similar in shape to the vessels they intended to make, and to coat the inside of these baskets with clay to the required thickness; the baskets, after being destroyed by the fire, left on the outer surface of the vessels peculiar impressions, resembling basket-work, which produce a very pleasing effect, and replace ornamentation to a certain extent.*

With this method the potters on the Cahokia creek were likewise acquainted, for I found a few pieces of their ware bearing the marks just mentioned. This sort of pottery, however, is not mixed with pounded shells, but with sand, and is much better baked than the other kind; it has a pale-reddish appearance, and is not painted.

Lastly, I have to enumerate among the objects of baked clay obtained from the deposit in the American Bottom, two articles resembling the beaks of large birds, perhaps detached pot or pan handles; a flat piece, forming the base of the figure of some animal, of which, unfortunately, the tail only remains, and the remnant of a toy canoe. The last-named specimen, probably made by some affectionate Indian mother for her little son, was picked up from the bottom of the creek.

The question now arises, who were the makers of these manufactures of clay? I simply ascribe them to the Cahokia Indians, who dwelt, until a comparatively recent period, on the banks of the creek that still bears the name of their tribe. Concerning the antiquity of the manufactures described on the preceding pages, I am not prepared to give an estimate. Only a hundred years may have elapsed since they were made, yet it is also possible that they are much older. The appearance of the fragments rather indicates a modern origin.

The writings of early, and even comparatively modern, authors on North America are not deficient in particulars relating to the art of pottery among the natives. According to their statements, those tribes were most advanced in the manufacture of earthenware, who inhabited the large tracts of land formerly called Florida and Louisiana, which comprise at present the southern and south-western States of the Union; and their testimony is fully corroborated by the character of such specimens of pottery from those parts as have escaped destruction, and are preserved in the collections of the country.† The Natchez, on the Lower Mississippi, perhaps the most civilized among the North American Indians, and supposed to be related to the Aztecs, were skilful potters. So we are told by the anonymous Portuguese gentleman called the "Knight of Elvas," who accompanied, towards the middle of the sixteenth century, De Soto on his adventurous expedition through a great portion of the North American continent, and became afterwards the chronicler of that bold Spaniard's exploits. In the province of Naguatex, he states, clay vessels were made "which differed very little from those of Estremoz or Montemor." These two towns in Portugal are noted for their earthenware.‡ *Du Pratz* mentions the "Ecore Blanc," on the

* Bartram describes a vessel of this kind which he extracted from a shell-mound on one of the islands near the coast of Georgia.—*Bartram's Travels*, Dublin, 1793, p. 6.

† "In some of the southern States, it is said, the kilns in which the ancient pottery was baked are now occasionally to be met with. Some are represented still to contain the ware, partially burned, and retaining the rinds of the gourds, &c., over which they were modelled, and which had not been entirely removed by the fire. In Panola county, Mississippi, are found great numbers of what are termed *pottery kilns*, in which are masses of vitrified matter, frequently in the form of rude bricks, measuring twelve inches in length by ten in breadth. It seems most likely that these *kilns* are the remains of the manufactories of the later tribes—the Choctaws and Natchez—'who,' says Adair, 'made a prodigious number of vessels of pottery, of such variety of forms as would be tedious to describe and impossible to name.'"—*Ancient Monuments of the Mississippi Valley*, Washington, 1848, p. 195.

‡ Virginia Richly Valued, by the Description of the Maine Land of Florida, her next Neighbour, &c. Written by a Portugall Gentleman of Eluas, employed in all the Action, and translated out of the Portugese by Richard Hakluyt, London, 1609, (reprint of 1812, Supplement,) p. 750.

Mississippi, as one of the localities where the Natchez obtained clay for their pottery, and likewise *ochre* to paint it. "When coated with ochre," he says, "it becomes red after the burning." Elsewhere, in speaking of the manufacture of clay vessels by the natives of Louisiana, the same author remarks: "The women make pots of an extraordinary size, jars with a small opening, bowls, two-pint bottles with long necks, pots or jugs for preserving bear oil, holding as much as forty pints, and, finally, plates and dishes in the French fashion."*

Dumont, who likewise describes the manners of the people inhabiting the extensive country formerly called Louisiana, has left a more minute account of the method they employed in making earthenware. He says: "After having amassed the proper kind of clay and carefully cleaned it, the Indian women take shells which they pound and reduce to a fine powder; they mix this powder with the clay, and having poured some water on the mass, they knead it with their hands and feet, and make it into a paste, of which they form rolls six or seven feet long and of a thickness suitable to their purpose. If they intend to fashion a plate or a vase, they take hold of one of these rolls by the end, and fixing here with the thumb of the left hand the centre of the vessel they are about to make, they turn the roll with astonishing quickness around this centre, describing a spiral line; now and then they dip their fingers into water and smooth with the right hand the inner and outer surface of the vase they intend to fashion, which would become ruffled or undulated without that manipulation. In this manner they make all sorts of earthen vessels, plates, dishes, bowls, pots, and jars, some of which hold from forty to fifty pints. The burning of this pottery does not cause them much trouble. Having dried it in the shade, they kindle a large fire, and when they have a sufficient quantity of embers, they clean a space in the middle, where they deposit their vessels and cover them with charcoal. Thus they bake their earthenware, which can now be exposed to the fire, and possesses as much durability as ours. Its solidity is doubtless to be attributed to the pulverized shells which the women mix with the clay."†

Adair, more than a century ago a trader with the tribes who occupied the southern portion of the present Union, confines himself to the following remarks:

"They make earthen pots of very different sizes, so as to contain from two to ten gallons; large pitchers to carry water; bowls, dishes, platters, basins, and a prodigious number of other vessels of such antiquated forms as would be tedious to describe and impossible to name. Their method of glazing them is, they place them over a large fire of smoky pitch-pine, which makes them smooth, black, and firm. Their lands abound with proper clay for that use."‡

Loskiel, who describes the manners of the Delawares and Iroquois, states that they made formerly kettles and cooking-pots of clay, which they mixed with finely pounded shells, and burned until they became black throughout. Quite large pieces of their pots, he says, in which the pounded shells could still be seen, were often found in such places where the Indians had dwelt in ancient times; but after the arrival of the Europeans very light kettles of brass had generally been introduced among them.§ Thus we see that these tribes began at an early period to neglect the manufacture of clay vessels.

A very good account relating to the art of pottery, as formerly practised by the western tribes, is given by *Hunter*. "In manufacturing their pottery for cooking and domestic purposes," he says, "they collect tough clay, beat it into powder, temper it with water, and then spread it over blocks of wood, which have been formed into shapes to suit their convenience or fancy. When sufficiently dried, they are removed from the moulds, placed in proper situations,

* *Du Pratz, Histoire de la Louisiane*, Paris, 1758, vol. i, p. 124, and vol. ii, p. 179.
† *Dumont Mémoires Historiques sur la Louisiane*, Paris, 1753, vol. ii, p. 271, &c.
‡ Adair's History of the American Indians, London, 1775, p. 424.
§ Loskiel, Geschichte der Mission der evangelischen Brüder unter den Indianern in Nord-Amerika, Barby, 1789, p. 70.

and burned to a hardness suitable to their intended uses. Another method practised by them is, to coat the inner surface of baskets made of rushes or willows with clay, to any required thickness, and when dry, to burn them as above described. In this way they construct large, handsome, and tolerably durable ware; though latterly, with such tribes as have much intercourse with the whites, it is not much used, because of the substitution of cast-iron ware in its stead."

"When these vessels are large, as is the case for the manufacture of sugar, they are suspended by grape-vines, which, wherever exposed to the fire, are constantly kept covered with moist clay. Sometimes, however, the rims are made strong, and project a little inwardly quite round the vessel so as to admit of their being sustained by flattened pieces of wood slid underneath these projections and extending across their centres."*

Lastly, I will quote here the remarks made by *Catlin* relating to the fabrication of earthenware among the Mandans. "Earthen dishes or bowls are a familiar part of the culinary furniture of every Mandan lodge, and are manufactured by the women of this tribe in great quantities, and modelled into a thousand forms and tastes. They are made from a tough black clay and baked in kilns which are made for the purpose, and are nearly equal in hardness to our own manufacture of pottery, though they have not yet got the art of glazing, which would be to them a most valuable secret. They make them so strong and serviceable, however, that they hang them over the fire, as we do our iron pots, and boil their meat in them with perfect success. I have seen some few specimens of such manufacture, which have been dug up in Indian mounds and tombs in the southern and middle States, placed in our eastern museums and looked upon as a great wonder, when here this novelty is at once done away with, and the whole mystery; where women can be seen handling and using them by hundreds, and they can be seen every day in the summer also, moulding them into many fanciful forms, and passing them through the kilns where they are hardened."†

The largest vessels made by the Indians, it seems, were those used in procuring salt by evaporation near salt springs. *Du Pratz* mentions a locality in Louisiana where the aborigines collected salt in earthen vessels made on the spot, before they had been supplied with kettles of metal by the French.‡ The "Knight of Elvas" likewise describes the method of salt-making employed by the natives. "The saline below St. Genevieve, Missouri," says *Brackenridge*, "cleared out some time ago and deepened, was found to contain wagon loads of earthenware, some fragments bespeaking vessels as large as a barrel, and proving that the salines had been worked before they were known to the whites."§

I had occasion to examine a fragment of a vessel of this kind sent to Dr. Davis in 1859 by Mr. George E. Sellers, who obtained it at the salt springs near Saline river, in southern Illinois, a locality where salt was formerly made by the Indians. Several acres, Mr. Sellers states, are covered with broken vessels, and heaps of clay and shells indicate that they were made on the spot. They presented the shape of semi-globular bowls with projecting rims, and measured from thirty inches to four feet across the rim, the thickness varying from one-half to three-quarters of an inch. This earthenware had evidently been modelled in baskets. The fragment sent to Dr. Davis is a rim-piece three-quarters of an inch thick, consisting of three distinct layers of yellowish clay, mixed with very coarsely pounded shells. It is solid and heavy, and must have been tolerably well baked. The impressions on the outside are very regular

* *Hunter's* Manners and Customs of several Indian tribes located west of the Mississippi, Philadelphia, 1823, p. 296, &c.

† *Catlin's* North American Indians, London, 1848, vol. i, p. 116.

‡ *Du Pratz*, vol. i, p. 307.

§ *Brackenridge*, Views of Louisiana, Pittsburg, 1814, p. 186.

and really ornamental, proving that those aboriginal potters were also skilful basket-makers.

It would be erroneous to suppose the art of manufacturing clay vessels had been in use among *all* the tribes spread over this widely extended country; for, though exhibiting much general similarity in character and habits, they differed considerably in their attainments in the mechanical arts. This was the consequence of local circumstances, such as configuration and quality of the soil, climate, and other natural conditions which influenced, or rather determined their mode of life. Some of the North American tribes, who did not understand the fabrication of earthen vessels, were in the habit of cooking their meat in water set to boiling by means of heated stones which they put into it, the receptacles used in this operation being large wooden bowls, water-tight baskets, or even the raw hides of animals they had killed. The Assinaboins, for example, cooked in skins. "There is a very curious custom among the Assinaboins," says *Catlin*, "from which they have taken their name—a name given them by their neighbors from a singular mode they have of boiling their meat, which is done in the following manner: When they kill meat, a hole is dug in the ground about the size of a common pot, and a piece of the raw hide of the animal, as taken from the back, is put over the hole, and then pressed down with the hands close around the sides, and filled with water. The meat to be boiled is then put in this hole or pot of water; and in a fire, which is built near by, several large stones are heated to a red heat, which are successively dipped and held in the water until the meat is boiled; from which singular and peculiar custom, the Ojibways have given them the appellation of Assinaboins or Stone-boilers."

"This custom," he continues, "is a very awkward and tedious one, and used only as an ingenious means of boiling their meat, by a tribe who was too rude and ignorant to construct a kettle or pot. The traders have recently supplied these people with pots; and even long before that, the Mandans had instructed them in the secret of manufacturing very good and serviceable earthen pots, which together have entirely done away the custom, excepting at public festivals, where they seem, like all others of the human family, to take pleasure in cherishing and perpetuating their ancient customs."* Yet, the Assinaboins may, nevertheless, have been acquainted with the art of pottery; for they are a detached branch of the Dacotahs, probably of the Yankton band of that nation, and we have the testimony of *Carver*, for instance, that the Naudowessies—that is, the Dacotahs or Sioux—made "pots of clay, in which they boiled their victuals."†

Some of the tribes of New Mexico and Arizona, as, for example, the Mojaves and Pimas, still manufacture pottery; but the Pueblo Indians of those districts are especially noted for their fictile fabrics. "They manufacture, according to their aboriginal art, both for their own consumption and for the purposes of traffic, a species of earthenware not much inferior to the coarse crockery of our common potters. The pots made of this material stand fire remarkably well, and are the universal substitutes for all the purposes of cookery, even among the Mexicans, for the iron castings of this country, which are utterly unknown there. Rude as this kind of crockery is, it nevertheless evinces a great deal of skill, considering that it is made entirely without lathe or any kind of machinery. It is often fancifully painted with colored earths and the juice of a plant called *guaco*, which brightens by burning."‡

Speaking of that region, I must not omit to allude, at least, to the numerous fragments of ancient pottery which occur on the Little Colorado (Colorado Chiquito), and Gila, especially among ruins, and are often highly decorated and painted with various colors, exhibiting a style of workmanship differing from

* *Catlin*, vol. i, p. 54.
† *Carver's* Travels, London, 1781, Harper's Reprint, p. 154.
‡ *Gregg's* Commerce of the Prairies, Philadelphia, 1851, vol. i, p. 278.

and surpassing that which prevailed on the eastern side of the Rocky Mountains. Descriptions of these relics, however, would exceed the intended limits of this essay, and, moreover, they have been given elsewhere, together with speculations concerning the character of the manufacturers.*

Some years ago, while visiting northern Europe, I had occasion to see many specimens of ancient pottery deposited in the archæological collections of that district, and having previously become acquainted with the character of North American aboriginal pottery, it afforded me great pleasure to trace the similarity in the fictile manufactures of both continents. Where the external conditions of life were similar among men, their inventive powers were necessarily exerted in a similar manner. We have the testimony of *Tacitus*, that the inhabitants of Germany lived, about two thousand years ago, much in the manner of the North American Indians, before the original habits of the latter had undergone the changes resulting from their intercourse with Europeans or their descendants; and it is, therefore, quite natural that both races should have resorted to the same, or, at least, similar means to satisfy their wants. The ancient flint implements of northern Europe bear a close resemblance to those formerly made by the natives of this country, and a like conformity is exhibited in the character of their manufactures of clay.

The aborigines of North America, to recapitulate the general characteristics of their pottery, formed their vessels by hand, modelling them sometimes in baskets, and were, as far as we know, unacquainted with the art of glazing. They mixed the clay used in their pottery either with pounded shells or sand, or with pulverized silicious rocks; mica also formed sometimes a part of the composition. Their vessels were often painted with ochre, producing various shades, from a light yellow to a dark brown, or with a black color. They decorated their pottery with lines or combinations of lines and dots, and embellished it also by notching the rims, or surrounding them on the outside with studs, or in various other ways. Their vessels exhibited a great variety of forms and sizes, and many of them had rounded or convex bottoms. They hardened their earthenware in open fires or in kilns, and notwithstanding the favorable statements of some authors, it was much inferior in compactness to the common crockery manufactured at present in Europe or America, and has even, in some instances, an appearance as though it had merely been dried in the sun.

The same details, somewhat modified, are applicable to the specimens of ancient pottery preserved in the museums of northern Germany, and frequently obtained from ancient burial places, where they had been placed by the side of the dead, or as receptacles of their ashes. Many of these vessels were evidently fashioned by hand; but others, especially the larger ones, bear the unmistakable traces of the lathe, the use of which was, perhaps, known to the German tribes before they had intercourse with the Romans. The clay composing these vessels is strongly mixed with quartz sand, to which very frequently mica is added, probably with a view to impart more solidity to the mass. Ancient Germau clay vessels, after being exhumed, are soft and so fragile that a somewhat rough handling destroys them at once. The roots of trees and shrubs have often grown through those that are dug up in woods, which obviously shows that they were not sufficiently burned; for well-burned clay, like that composing the pipes of Roman aqueducts and the bricks of the middle age, resists humidity even better than many kinds of stone. When exposed to the air, these vessels become tolerably hard within a few hours; but in rare instances only they have that peculiar ring which characterizes well-burned earthenware. It seems, therefore, that they were not burned in kilns, but merely in strong open fires.† Many

* The reader is referred to an excellent chapter by *Mr. Thomas Eubank*, entitled "Illustrations of Indian Antiquities and Arts," in the third volume of Pacific Railroad Reports, Washington, 1856.

† *Klemm*, Germanische Alterthumskunde, Dresden, 1836, p. 167.

of the urns are painted with yellow or red earths, or a black color, the latter pigment being sulphuret of molybdenum. May not the same substance, which occurs in many localities of the United States, have been used by the Indians for blackening their pottery? An analysis would easily decide the question. The same parallel and zigzag lines, or rows of dots, which decorate Indian vessels, are also seen on the ancient pottery of the north of Europe, and of other parts of that continent. They constitute the simplest elements of ornamentation, and have, therefore, everywhere been employed by man when he made his first attempts in the art of decoration. On the surface of a few ancient vases or urns found in Germany I noticed those markings which present the appearance of basket-work; I was, however, in doubt whether they were impressions produced by the inside of baskets, or simply ornamental lines traced on the wet clay. Yet, even in the latter case, it would seem that this kind of ornamentation was suggested by the former practice of modelling vessels in baskets. I further saw some apparently very old specimens of pottery with rounded bottoms. The oldest vessels of all nations, who practised the potter's art, probably exhibited that shape, the model of which was furnished by nature in the gourd and other fruits presenting rounded outlines. A flat bottom, therefore, would denote a progress in the ceramic art. Other particular features common to the pottery of both, the ancient inhabitants of Germany and the aborigines of North America, might be pointed out; but the fictile fabrics of the former exhibit, on the whole, more elegance of outline, and therefore indicate a higher state of art. The similarity in the manufactures of men in various climates is greatest when art is in its very infancy among them. In the course of gradual development, the primitive forms common to mankind become more and more indistinct, and finally emerge into those varied and characteristic shapes which reflect the individuality of nations.

DRILLING IN STONE WITHOUT METAL.

BY CHARLES RAU.

Some archæologists, among them Sir John Lubbock, incline to the opinion that the perforated stone axes and hammers which have been found in Europe are to be referred to the beginning of the bronze period. Many of those implements doubtless belong to the age of bronze; they have frequently been discovered in connection with bronze articles in ancient graves, and it is, moreover, well known that the manufacture and use of stone weapons and implements were everywhere continued for a long time after the introduction of bronze. These facts, however, furnish no evidence for ascribing pierced stone implements generally to the period in which the use of bronze was already known; in many cases, on the contrary, it may be inferred from the nature of their finding-places, as well as from the character of their perforations, that they belong to the stone age proper. In the illustrated catalogue of the collection in the Copenhagen museum, edited by Mr. J. J. A. Worsaae,* there are eleven representations of pierced stone implements attributed to the age of stone, and the foremost objects, figured to illustrate the bronze period, consist of seven perforated stone axes, distinguished by elegant shape and superior workmanship. Though I am not acquainted with the particular circumstances of the discovery of these implements, I have not the least doubt that the learned editor of the catalogue, in referring them respectively to the ages of stone and bronze, based his classification on tenable grounds.

A number of those lacustrian pile-works, which pertain exclusively to the stone age, have yielded stone axes and hammers, as, for instance, the station of Nussdorf, on the Lake of Ueberlingen, (an arm of the Lake of Constance) where no less than fifty have been found. Mr. Desor, on whom I rely for these facts, also mentions that in another lacustrian station of the stone age the articles in question are confined to the upper part of the "archæological stratum," that is, the stratum which contains relics of art. Pierced implements, therefore, would seem to belong, in those localities at least, to a later epoch of the stone age, and thus to mark a phase of progress in the gradual development of human skill during that period.†

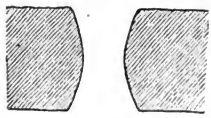
After a careful examination and comparison of the shaft-holes of European stone implements, I have arrived at the conclusion that two different methods, or, at least, two differently shaped drills were employed in making them. The more perfect perforations are of equal width, smooth and shining, and exhibit at certain distances circular striæ or furrows, which have the appearance of a succession of parallel rings. These perforations, I think, have been drilled with a hollow cylinder, perhaps a bronze tube, and I believe that the implements pierced in the manner described were mostly manufactured during the age of bronze. They are, moreover, very often remarkable for elegance of outline and high finish, indicating a state of art superior to that which is generally supposed to have existed in Europe during the period of stone. In other specimens the

* Worsaae, Nordiske Oldsager i det Kongelige Museum i Kjöbenhavn, 1859.

† Desor, Palafittes, or Lacustrian Constructions of the Lake of Neuchâtel; Smithsonian Report for 1865, p. 359, (note.)

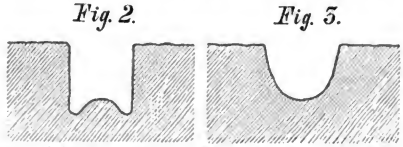
shaft-holes are likewise more or less smooth, but destitute of the annular striæ, and sometimes narrower in the middle, in which cases, of course, a circular protuberance of corresponding size is formed. (Fig. 1.) These holes evidently were drilled from two sides, and the drilling implement was not a hollow cylinder, but a solid body, probably a wooden stick. Most of the axes and hammers provided with shaft-holes of this character are perhaps relics of the age of stone. It is hardly necessary to state that without the application of water and hard sand, drilling with either implement, hollow or solid, would have been impossible, and that the sand is to be considered as the chief agent in the process.

Fig. 1



I had occasion to examine a number of European stone hatchets and hammers, which were in an unfinished state, the shaft-holes being only commenced or drilled half through, and the appearance of the latter perfectly corroborated my view concerning the different shapes of the drills used in making them; for some of these unfinished holes, and just such as belong to the striated class, have at the bottom a conical projection or a core, (Fig. 2,) which obviously resulted from the application of a hollow drilling implement; while others (Fig. 3) terminate in a rounded concave bottom, resembling exactly the cavity made by a wooden stick used as a drill.* I would not express this latter opinion so positively, if I could not rely on the results of experiments, having, in fact, succeeded in perforating a hard stone without any use of metal by means of a stick, in connection with sand and water. An account of the method employed by me, and of the results, I hope will be of interest to those archæologists who pay some attention to the minor details of their study.

Fig. 2. *Fig. 3.*



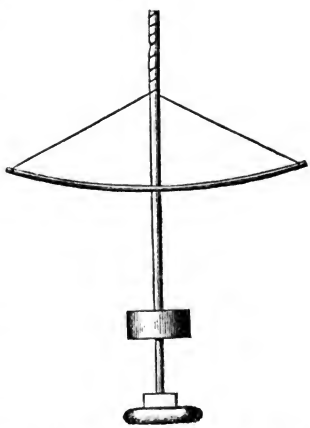
In the first place, I will give a description of my drilling implement, (Fig. 4,) which is, in fact, a pump-drill, the same apparatus that was used in former times by the Iroquois for the purpose of producing fire by friction.† It consists of a round wooden shaft, about four feet long and an inch in diameter at the upper end, but tapering a little towards the lower extremity, where it is provided with a heavy wooden disk, which acts as a fly-wheel. A bow or bent stick, three feet in length, with a long string attached to it, forms the second part of the apparatus. When used the string of the bow is passed through a notch cut in the top end of

* It afforded me some satisfaction to find my views confirmed, to a certain extent, in a work of Dr. Gustav Klemm. This author first alludes to Gutsmuths, who published an article in the "Morgenblatt," (1832, No. 253,) in which he tried to prove that a hollow cylinder of metal, used with emery in the manner of toothless stone saws, was the drilling implement of the ancients, basing his opinion upon the same facts which I already have stated, namely, the regularity of the holes, the core at their bottom, and the circular furrows. Klemm himself possessed in his collection a hollow bronze tube, five inches long, three-quarters of an inch in diameter, and covered all over with green rust, the *ærugo nobilis* of antiquaries. With such implements, he thought, the shaft-holes had generally been drilled, "but continued observation," he says, "convinced me that other methods also must have been employed. A stone axe of my collection, bored from two sides, exhibits conical cavities, the shape of which at once excludes the idea that a hollow cylinder was used in drilling them; the implement with which they were made, probably in a slow and painful way, evidently was a solid body." (*Klemm, Allgemeine Culturwissenschaft, Werkzeuge und Waffen, Leipzig*, 1854, *p.* 79.)

† Morgan, League of the Iroquois, Rochester, 1851, description and figure on page 381. Mr. Tylor gives likewise, on page 245 of his valuable "Researches into the Early History of Mankind," (London, 1865,) a drawing of the apparatus, but represents it as being moved with one hand only. In order to maintain the equilibrium of the shaft, it is necessary to apply both hands to the bow.

the stick and coiled around the stick, as indicated in the drawing. The bow is then seized with both hands and pressed downwards with a violent jerk. This motion uncoils the string and revolves the shaft towards the left, but by the action of the fly-wheel the string is coiled again around the shaft in a reverse manner, and the bow drawn up again. A second jerk at the bow causes the shaft to revolve towards the right, and by continuing this manipulation it is alternately swung around in opposite directions. The operator has it altogether in his power to work the apparatus slowly or rapidly, and, of course, with corresponding effect; but it requires some practice to use it in the proper manner.

Fig. 4.



The stone selected by me for the experiment is a flat, oval piece of diorite, of great hardness, not quite seven inches long, about five inches wide, and in the middle part one inch and three-eighths (a little over 3.5 centimeters) thick. I chose purposely that kind of stone, because it is the same of which the ancient inhabitants of Europe very often made their pierced implements. It is both hard and tough. These qualities were likewise appreciated by the North American aborigines, who used diorite extensively as the material for their tomahawks, large chisels, and pestles. The stone on which I operated is so hard that the point of a well-tempered penknife produces no scratch on its surface, but merely a metallic streak. The material used in drilling was a sharp quartz sand of middle grain, such as is employed in marble-yards; for a short time I also tried emery, but finding that it was not more effectual than sand, I continued to apply the latter. In order to render a beginning of the perforation possible, I tied a small square piece of board in which I had cut a round hole, corresponding to the lower diameter of the drilling-stick, with a string to the stone, just above the place where the bore was to be commenced. Without this contrivance, which I had to retain during the whole drilling process, the stick would constantly have slipped out of the hole. After these preparations I could begin the work, which was not very fatiguing, but tedious beyond description, taxing, in fact, my patience to the utmost degree. I never could endure the work for more than two hours in succession, and sometimes I laid the stone aside for weeks and months, until I had mustered sufficient energy to resume the labor. Thus it took two years before I succeeded in piercing the stone. I cannot exactly state how many hours I devoted to the work, but by measurement I obtained the result that two hours of constant drilling added, on an average, not more than the thickness of an ordinary lead-pencil line to the depth of the hole. The work would have advanced with incomparably greater speed, if I had selected a softer stone, serpentine, for instance, instead of the hard diorite; it was, however, my object to try the experiment on a hard mineral substance. Every five or six minutes the bore had to be cleaned by immersing the stone in water, the sand being by that time perfectly ground, and forming, in connection with the water and the particles of wood rubbed from the stick, a sort of paste, which was no longer serviceable for drilling. The quantity of sand introduced after every cleaning was about equal to the contents of a teaspoon. The shortening of the drilling-stick,

in consequence of wear, was considerable, and I had to replace it several times. The first was of tough ash wood; the others, which consisted of pine wood, proved to be just as efficient.

In the beginning of the work there appeared at the place of perforation a smooth, round spot. Becoming gradually larger, it formed a shallow basin, which finally, when the stone was drilled half through, assumed the appearance of a conical or funnel-shaped cavity. The deeper the drill penetrated into the stone the more difficult the work became, which induced me, after having drilled through half the thickness of the stone, to begin another bore at the opposite side. In due time it met the first exactly in the middle. It was originally my intention to drill a hole of about three-quarters of an inch in diameter, but I had not made sufficient allowance for the lateral friction of the sand, and hence it happened that the two conical cavities forming the perforation acquired, much against my wish, greater proportions than I expected, measuring, in fact, an inch and a quarter in their widest diameters. They would have become *narrower* as well as *more cylindrical*, if I had used a drill half as thick as that which served in the operation; but when I made this discovery the work was already too far advanced to be commenced again. Fig. 5 shows the present shape of the perforation. It is round and smooth, without exhibiting those circular furrows, which I have already ascribed to the action of a *hollow* drill. In order to complete the task in its fullest extent by producing a perfectly cylindrical hole, it would be necessary to remove, by continued drilling, the projecting rim between the dotted lines: a labor probably requiring as much time as that hitherto consumed. I cannot say whether I shall have sufficient leisure and patience to perform it; for the present I am satisfied with the fact of having, perhaps, practically illustrated one of the methods of drilling employed during the age of stone. Of course, it would be rashness on my part to assert that the apparatus used by me had also served as a drilling implement in ancient Europe; yet the possibility cannot be denied, for just as the Iroquois invented it for producing fire, the ancient nations of Europe may have constructed it for another purpose. Mr. Desor thinks it probable that the drilling was effected by means of very thin flakes of flint fixed around a stick, which was made to turn in such a way as to separate a portion of the stone, which, when the perforation was accomplished, would fall to the ground.* A drilling-stick of this description really may have served for perforating soft stones, but could not be successfully applied to hard materials. I operated myself with such a drill on diorite, and found the flint flakes invariably break off after the first revolutions. Yet, whatever may have been the means employed in drilling stone in the pre-historic ages of Europe, it is certain that the carefully fashioned and pierced implements must have possessed a very high value in the eyes of their manufacturers. Some indication of this fact is offered by the occurrence of the edged halves of axes broken across the shaft-hole, which had been rendered serviceable again by a second perforation. A specimen of this kind, of which the annexed reduced sketch (Fig. 6) presents the upper view, is preserved in the Peabody Museum at Cambridge, Massachusetts. It was found in northern Germany. The shaft-hole, which has been left in an unfinished state, evidently was formed by a solid drill. The material of this relic is a variety of greenstone.

Fig. 5.

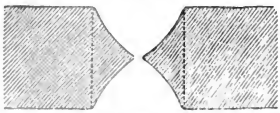
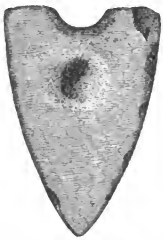


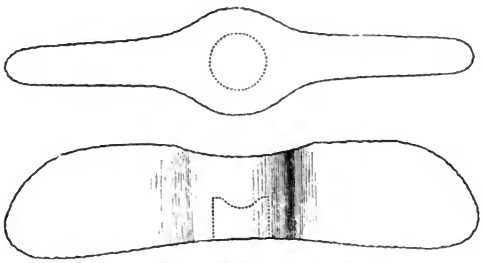
Fig. 6.



* Palafittes, &c., p. 359.

In North America the grooved tomahawk was, anterior to the occupation by Europeans, the prevailing implement of the axe-shape;* but pierced articles of this class also have been found, though not very frequently. Several are figured on page 218 of the "Ancient Monuments of the Mississippi Valley," by Squier and Davis. The material of most of those which I have seen is a rather soft stone of a greenish color, with darker veins or spots, capable of a fine polish. These perforated axes are mostly small, but very symmetrically shaped and highly finished. They were most probably worn on handles as badges of distinction by the superiors,† a supposition which gains strength from the fact that their material renders them unfit for real use. I know by experience that they occur from the Mississippi to the Atlantic coast. The peculiar stone of which they consist was also used for other objects, (the so-called gorgets, amulets, &c.,) and may have been an article of trade. The shaft-holes of these hatchet-like implements are exceedingly regular, and the annular striæ can often plainly be distinguished. They were doubtless produced by means of hollow drills, as will be seen hereafter. In addition to the perforated Indian axes just mentioned, there occur others, which are remarkable for being only pierced to a certain depth. It is true, I have not seen these latter very frequently, but in sufficient number to become convinced that the shaft-holes were purposely left in an unfinished condition. Their material is not the soft stone already referred to, but a harder substance, usually some kind of greenstone. They always present pretty much the same shape. The annexed half-size sketch (Fig. 7, upper and side view) shows the outline of one of these imple-

Fig. 7.



ments, which was found in western Massachusetts, and is now in the possession of Dr. Davis, of New York. The core at the bottom of the shaft-hole, which is indicated by dots, affords an indubitable proof that a hollow drill was employed. To render this implement serviceable for use, or even for show, a handle was driven as far as possible into the shaft-hole, and probably more firmly bound to

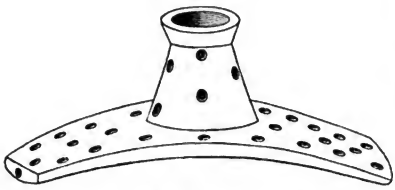
* Some ethnological writers, McCulloh and Schoolcraft, for instance, consider these stone axes as tools, and not as weapons; whereas it is most probable that they served both purposes, as occasion required. Men who were confined to the use of stone implements cannot be expected to have been very choice in their applications. A stone tomahawk, firmly attached to a withe, presented a very efficient battle-axe. Mr. Catlin gives, on plate 114 (vol. 2) of his well-known work, the portrait of *Mensónseah* (the Left Hand,) a Piankeshaw warrior, whom he represents with a helved stone tomahawk in his hand. Would this brave have allowed the artist to paint him thus accoutred, if he had not regarded his stone axe as a weapon? An Indian warrior, in his contempt for labor, certainly spurns the idea of being portrayed with a tool in his hand.

† Many of the perforated implements of Europe are supposed to have been destined for the same purpose.

the blade by ligatures. The depressions of the axe above and below the shaft-hole (observable in the side view) seem to have been destined for the reception of the fastening.

Yet, the manufactures of stone which evince the greatest skill of the former inhabitants of North America are by no means their pierced axes, but those remarkable pipes, often made of the hardest stones, that have been found in the so-called sacrificial mounds of the western States, but more especially in Ohio. These "mound pipes" usually represent bowl and tube in one piece, thus differing from the modern Indian pipe, which consists of a bowl and a long wooden stem, and bears a distant resemblance to the *chibouc* of the Turks. A great number of pipes of the above-mentioned antique shape were disentombed by Messrs. Squier and Davis during their survey of the ancient earth-works in the Mississippi valley, and are described and figured in their work already quoted by me, which forms the first volume of "Smithsonian Contributions to Knowledge."* The accompanying cut (Fig. 8) presents the outline of the mound-pipe in its simple or primitive form. The drawing is about half the size of the original, which was exhumed with many similar articles from a mound near Chillicothe, Ohio, and belonged formerly to the collection of Dr. Davis. It will be seen that the bowl rises from the middle of a flat and somewhat curved base, one side of which communicates by means of a narrow perforation, one-sixteenth of an inch (about four millim.) in diameter, with the hollow of the bowl, and represents the tube or rather the mouth-piece of the pipe, while the other unperforated end forms the handle by which the smoker held the implement and approached it to his mouth. Bowl and base are ornamented with small cup-shaped holes. This pipe consists of hard porphyry, and is wrought from a single piece, like all others of similar character. I have already stated that it may be considered as the simple or typical form of this class of implements. In the more elaborate specimens the bowl is formed in some instances in imitation of the human head, but generally of the body of an animal; and in the latter cases the peculiar characteristics of the species which have served as models, comprising mammals, birds, and amphibia, are frequently expressed with surprising fidelity; a modern artist, indeed, notwithstanding his far superior instruments, would find no little difficulty in reproducing the more finished of these objects, especially when carving them from porphyry, which was the kind of stone chiefly employed by the manufacturers. It must be borne in mind that the real use of metal was unknown to the ancient populations of North America. Implements and ornaments of copper, it is true, have been discovered, to a limited extent, in the mounds of the western States, and elsewhere, but the copper thus employed has not been obtained by the reduction from its ores; on the contrary, it is evident that the aborigines fashioned those articles from pieces of *native* copper, which they brought into the required shape by the simple process of hammering. They obtained the copper from the southern shore of Lake Superior, where extensive traces of their rude mining operations are still

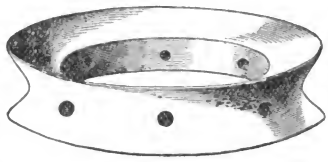
Fig. 8.



* The originals are now in the Blackmore Museum, at Salisbury, England, an institution of recent origin, to which Dr. Davis sold his excellent collection of Indian relics, mostly obtained during the survey to which I have alluded. Before the sale took place, I had constantly occasion to see the collection, and thus became familiar with the character of the specimens.

to be seen.* This hammered native copper is so soft that it can easily be cut with a knife, and therefore cannot have furnished the implements for working those hard mineral substances, which, indeed, successfully resist well-tempered steel. As a consequence, it must be presumed that the manufacturers of the pipes performed their work in the most tedious and painful manner, by rubbing the stone and grinding it with sharp sand and water, although this method leaves many details in the execution of their productions unexplained. In viewing, for example, their figures of birds, it is difficult to comprehend how they succeeded in representing the feathers, which are indicated by steady and boldly cut lines, straight and curved, in close imitation of nature.† The perforations and hollows of the mound-pipes are drilled with perfect accuracy, showing at once that the implement which produced them was not merely turned between the hands, but moved by an apparatus which coincided, in all probability, with the bow-drill still used by watchmakers and other artisans. The latter, it is well known, consists of a straight drill, which passes through the centre of a disk grooved at the periphery and revolves around two fixed points, one of them being formed by the bore. Motion is imparted by means of a bow, the string of which encircles the disk. It certainly would appear hasty to attribute to the aborigines of North America a knowledge of this implement, if it were not for the circumstance that there occur among the relics of the former population rings of stone and bone which are almost identical with the disks just mentioned, and most probably have served the same purpose. In fact, it is almost impossible to assign them any other destination. These rings are of various sizes, but similar in shape, being deeply grooved upon the outer edge, and pierced by eight equidistant small holes radiating from the centre.‡ Fig. 9 is a full-sized drawing of one which was discovered in a mound on the north fork of Paint creek, about six miles distant from Chillicothe, Ohio. The sketch, however, represents the object as perfect, whereas the original, formerly belonging to Dr. Davis, constitutes only one-half of the ring, which consists of a dark stone of medium hardness. The character of the rings encourages me to attempt the restoration of the an-

Fig. 9.



* Only the inhabitants of Mexico, and some countries in the southern portion of the American continent, understood the manufacture of bronze. It will hardly be necessary to add that iron was altogether unknown to the natives of America until Europeans taught them its use.

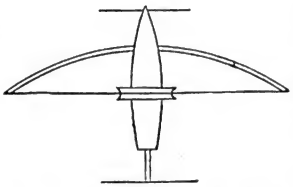
† The amount of labor bestowed upon the manufacture of these specimens must have been enormous, considering the time it is said to have required for fashioning articles of a much simpler character. According to Lafitau a North American Indian sometimes spent his lifetime in making a stone tomahawk, yet without entirely finishing it. *Lafitau, Mœurs des Sauvages Amériquains, Paris*, 1724, *vol.* 2, *p.* 110.

"Mr. Wallace has found that plain cylinders of imperfect rock crystal, four to eight inches long, and one inch in diameter, are made and perforated by very low tribes on the Rio Negro. They are not, as Humboldt seems to have supposed, the result of high mechanical skill, but merely of the most simple and savage processes, carried on with that utter disregard of time that lets the Indian spend a month in making an arrow. They are merely ground down into shape by rubbing, and the perforating of the cylinders, crosswise, or even lengthwise, is said to be done thus: A pointed flexible leaf-shoot of wild plantain is twirled with the hands against the hard stone, till, with the aid of fine sand and water, it bores into and through it, and this is said to take years to do. Such cylinders as the chiefs wear are said sometimes to take two men's lives to perforate. The stone is brought from a great distance up the river, and is very highly valued."—*Tylor, Researches, &c., p.* 187.

‡ Ancient Monuments of the Mississippi Valley, p. 224.

cient Indian bow-drill, which may have presented the shape indicated by Fig. 10.

Fig. 10.

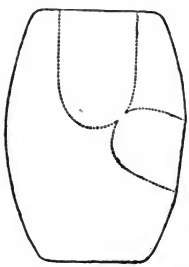


The ring, it seems, encircled a massive drill-holder, to which it was fastened by pegs driven through the holes on its periphery. Their purpose is thus fully explained.

May not an apparatus of similar construction also have been known in Europe during the bronze age, and even at an earlier period? In using the pump-drill, described and figured by me, constant oscillations of the shaft, tending to enlarge the bore, cannot be avoided; but they are altogether obviated when, as in Fig. 10, the upper end of the shaft or drill-holder revolves around a fixed point. And further, may not in Europe as well as in America the latter more perfect apparatus have superseded, in the course of time, the simpler contrivance with which I have experimented? This view will not appear strange, considering that man in all parts of the globe progressed slowly, and that every new development of ingenuity was based upon the results of former experience.

The greater number of drilled Indian implements which I had occasion to examine bore the unmistakable marks of having been perforated with hollow drills; yet I have also seen Indian performances in drilling indicating the application of solid implements. As an illustration I annex (Fig. 11, full size) the drawing of a pipe consisting of almost transparent rock crystal, which was taken from a mound near Bainbridge, Ross county, Ohio, and is now the property of Dr. Davis. Its shape, it will be observed, is that of a barrel somewhat narrowing at the bottom; it is regularly formed and highly polished. I left the drawing purposely without shading in order to indicate the two hollows, of which the upper one served as the receptacle for the smoking material, while that which meets it from the side was destined for the insertion of a stem. The terminations of the hollows are rounded, and consequently have been drilled with a solid implement.

Fig. 11.



It is very likely that the *hollow* drills of the aborigines of North America were pieces of that hard and tough cane *(Arundinaria macrosperma*, Michaux,) which grows abundantly in the southern part of the United States, mostly along the banks of large rivers, and forms at present an article of trade, being used for pipe-stems and fishing-rods. This cane varies considerably in thickness; sometimes as thin as a straw, it assumes, when fully grown, the diametral proportions of a strong rifle-barrel, and even of larger cylindrical objects, in which cases it reaches the enormous height of 25 or 30 feet. A piece of this cane, from which the knotty joints have been cut, forms a regular hollow cylinder sufficiently strong to serve as a drill. I learned from Dr. Davis that many years ago a stone pipe with an unfinished hollow, partly filled with vegetable matter, was sent from Mississippi to the late Dr. Samuel G. Morton, of Philadelphia. When subjected to a microscopical examination the vegetable substance exhibited the fibrous structure of cane, and thus appeared to be the remnant of a drill broken off in the bore. It is, however, my intention to try the applicability of this cane by drilling experiments.

In conclusion, I will observe that the more finished stone articles of the former inhabitants of North America, and especially the pipes from the mounds, are

perhaps the best specimens of art left by any people to whom the use of metal was unknown, and that in examining the archæological collections of Europe, I have seen no objects produced under similar circumstances which display an equal degree of skill in the art of fashioning stone.

Ancient Stone Axes from North Germany.

A DEPOSIT OF AGRICULTURAL FLINT IMPLEMENTS IN SOUTHERN ILLINOIS.

BY CHARLES RAU.

In an article published in the Smithsonian report for 1863 I gave, for the first time, an account and drawings of certain North American flint implements of large size and superior workmanship, which were evidently used by the aborigines for cultivating the soil and other digging purposes, and hence, according to their shape, classified by me as *shovels* and *hoes*. The annexed figures represent both kinds of implements. I described the shovels (Fig. 1) as oval plates of flint, flat on one side and slightly convex on the other, the outline being chipped into a sharp edge. The specimen here figured measures above a foot in length, a little more than five inches in its greatest breadth, and is about three-quarters of an inch thick in the middle. Others are narrower and not quite as heavy. The shape of the hoes is illustrated by Fig. 2. This specimen is seven and a half inches long, nearly six inches wide, and about half an inch thick in the middle. The rounded part forms a sharp edge. The material of which these implements are made is a peculiar kind of bluish, gray or brownish flint, of slightly conchoidal fracture, and capable of splitting into large flat fragments. I never succeeded in discovering this stone *in situ*. The agricultural implements of my collection were all found in St. Clair county in southern Illinois, with the exception of one shovel, which was dug up in 1861 in St. Louis, during the construction of earthworks for the protection of the city. Both shovels and hoes were, doubtless, attached to handles, those of the latter probably forming a right, or even an acute angle with the stone blade, which is always provided with two notches in the upper part to facilitate the fastening.*

1

2

* I quoted a passage from *Du Pratz*, which is, perhaps, referable to the hoes. According to this author, the natives of Louisiana had invented a hoe, (pioche) with the aid of which they prepared the soil for the culture of maize. "These hoes," he says, "are shaped like a capital L; they cut with the edge of the lower part, which is entirely flat."—*Histoire de la Louisiane*. Paris, 1758. Vol. II, p. 176.

Plate XXI, in vol. II of *De Bry*, (Frankfort, 1591,) represents Florida Indians of both sexes engaged in field labor, the men using the hoe and the women sowing. The Latin text (by Le Moyne) accompanying the engraving states that the hoes are made of fish-bone, (*ligones e pisciun ossibus*) and provided with wooden handles. The women sow beans and maize—"*feminæ fabas & milium sive Mayzum serunt.*"

Some of the shovels, like the specimen of which a drawing is given, measure a foot and more in length, and consequently are among the largest flint tools thus far discovered in any part of the world. Neither the rude hatchet-like and lanceolate implements found in the "drift" of France and England, associated with the osseous remains of the mammoth, the rhinoceros, and other animals of a bygone fauna, equal them in size; nor have, to my knowledge, the caves of the reindeer period in southern France and Belgium, once the resorts of savage hunting tribes, yielded any chipped flint articles of the same dimensions. Indeed, they are rivaled, as I think, only by the large flint celts of Scandinavia and northern Germany, which belong to a more advanced stage of the European stone age.

That the North American flint tools described by me were really used for digging can hardly be doubted. "If the shape of these implements," I stated in my account, "did not indicate their original use, the peculiar traces of wear which they exhibit would furnish almost conclusive evidence of the manner in which they have been employed; for that part with which the digging was done appears, notwithstanding the hardness of the material, perfectly smooth, as if glazed, and slightly striated in the direction in which the implement penetrated the ground." I further mentioned that this peculiar feature is common to all specimens of my collection as well as to the few which I have seen in the hands of others; and that they seem to be rather scarce, and merely confined to certain States bordering on the Mississippi river.

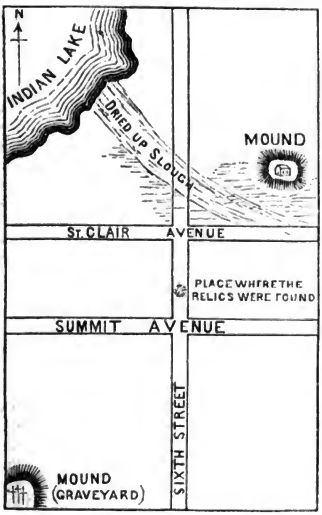
I was, therefore, much interested in the recent discovery of a large *deposit* of such implements at East St. Louis, (formerly Illinoistown,) in St. Clair county, Illinois, a place situated directly opposite the city of St. Louis, in the so-called "American Bottom," which forms a fertile plain extending for a considerable distance along the Mississippi shore in Illinois. This region, I must state, is very rich in Indian remains of various descriptions,* but particularly interesting on account of numerous artificial mounds, among which the celebrated truncated pyramid called Cahokia Mound, or Monk's Mound, is by far the most conspicuous, reminding the beholder of those gigantic structures in the valley of the Nile, which the rulers of Egypt have left to posterity as tokens of their power and their pride.

The particulars of the discovery to which I alluded were communicated to me by Dr. John J. R. Patrick, of Belleville, Illinois, a gentleman to whom I am greatly indebted for long-continued co-operation in my pursuits relative to the subject of American antiquities. As soon as Dr. Patrick heard of the discovery he hastened to East St. Louis, for the purpose of ascertaining on the spot all details concerning the occurrence of those flint tools; and in order to obtain still more minute information, he afterwards repeatedly revisited the place of discovery which is about 14 miles distant from Belleville, and can be reached after a short ride, the latter place being connected by railroad with East St. Louis. The removal of ground in extending a street disclosed the existence of the deposit, and Dr. Patrick derived all facts concerning its character from Mr. Sullivan, the contractor of the street work, who was present when the tools were exhumed, and therefore can be considered as a reliable authority. The results of my informant's inquiries, communicated in various letters addressed to me, are contained in the following account:

In the early part of December 1868, some laborers, while engaged in grading an extension of Sixth street in East St. Louis, came upon a deposit of Indian relics, consisting of flint tools, all of the hoe and shovel type, and of small fossil marine shells, partly pierced, and in quantity about equal to the contents of a bushel. Close by were found several boulders of flint and greenstone, weighing

* Some years ago I discovered near East St. Louis the traces of an Indian pottery, described in the Smithsonian report for 1866.

from 15 to 30 pounds each, and many fragments of flint. The soil in the immediate neighborhood is composed of black loam, overlying a stratum of a sandy character, and the deposit which occurred in the latter, was covered with from 18 to 24 inches of the black earth, bearing a luxuriant turf on its surface. According to the contractor's statement, the flint tools, the shells, and the boulders were deposited in three separate holes dug out in the sand, but not more than a foot apart from each other, and placed like the corners of a triangle. To use his language, the implements formed a "nest" by themselves, and so did the shells, and likewise the boulders. The flint tools, however, instead of being packed close together, like the shells and the boulders, were arranged with some regularity, overlapping each other or standing edgewise, and covering a circular space. The whole deposit did not extend more than seven or eight feet on either side. The contractor neglected to count the implements, but he thinks there were from 70 to 75 in all; some 50 hoes and about 20 shovels. No other stone articles, such as arrow and spear-heads, tomahawks, &c., had been deposited with the agricultural implements. The latter were soon taken away by persons from the place, attracted by the novelty of the occurrence, and it is to be regretted that many, if not most of them, have fallen into the hands of individuals who are unable to appreciate their value. But this is usually the case when discoveries of similar character are made. Dr. Patrick examined upwards of 20 of the flint implements, and found that none of them had been used, as they had not received the slightest polish on the cutting edge.



The place of discovery lies about a mile and a half, or still further, from the Mississippi, on elevated ground, and above ordinary high-water mark; but formerly, before the bed of the river was narrowed by the dike connecting the Illinois shore with Bloody Island, the distance cannot have been more than half a mile. The spot is situated nearly midway between two mounds, half a mile apart from each other. One of them was formerly used as a graveyard by the French of the neighborhood, and the other serves as the substructure for a dwelling-house. The accompanying plan (furnished by my correspondent) gives a view of the locality.

Several of the agricultural implements found at East St. Louis are now in my possession. Their material is a yellowish-brown variety of the flint to which I already referred. In shape they correspond with the tools of the same class previously described by me; most of the shovels, however, instead of having the end opposite the cutting part worked into a rounded edge, (like Fig. 1,) terminate in a more or less acute angle. The edges of all are chipped with the utmost regularity, and exhibit not the slightest wear, which proves that the implements were in a perfectly new condition when buried in the ground.

The fossil shells of marine origin are all small univalves, and belong almost entirely to the genus *melampus*. Of nearly 300 specimens sent to me by Dr. Patrick, 19 only represent other genera, namely, *columbella, marginella. conus,*

and *balla*. All have a decayed and chalky appearance. They were probably obtained in the neighborhood, and obviously destined for ornamental purposes. This may be inferred from the fact that a number of the *melampus* shells are pierced with one hole in the lower part, (Fig. 3, natural size,) which was sufficient for stringing them, as the connecting thread could easily be passed through the natural aperture of the shell. On close examination I found that these shells had been reduced, by grinding, to greater thinness at the place of perforation, in order to facilitate the process of piercing.

3

The boulders, which formed a part of the deposit, were probably designated for the manufacture of implements. A piece of one of the boulders was sent to me for examination. It is a compact diorite, the material of which many ground articles of the North American Indians, such as tomahawks, chisels, pestles, &c., are made.

It would be useless to speculate on the antiquity of the objects thus accidentally discovered, for there are no indications for determining, even approximately, the period when they were buried. It is far easier to account for the motives which induced the owners of the tools and the other objects to dispose of them in the manner described. Their object was, in all probability, to *hide* them. Perhaps they left the place with a view to return and to take possession again of their concealed property, but were prevented from carrying out their intention. Or, they may have buried them in time of war, when they were killed, driven away, or led into captivity; and their "hidden treasure" lay undisturbed in the ground, perhaps for centuries, until the spade of the Irish laborer brought it to light again. There is no room whatever for the supposition that this deposit constituted one of those religious offerings by which the ancient inhabitants of the Mississippi valley believed they could gratify or propitiate the powers that ruled their destinies.

Similar deposits of flint articles have repeatedly been discovered in the United States,* and Messrs. Squier and Davis mention several instances of this kind in their work entitled "Ancient Monuments of the Mississippi Valley." The most extensive accumulation described by them occurred in one of the so-called sacrificial mounds of "Clark's Work," on North Fork of Paint creek, Ross county, Ohio. This mound contained, instead of the altar usually found in this class of earth-structures, an enormous number of flint disks standing on their edges, and arranged in two layers one above the other, at the bottom of the mound. The whole extent of these layers has not been ascertained; but an excavation six feet long and four broad disclosed upwards of six hundred of those disks, rudely blocked out of a superior kind of grayish striped flint. I had occasion to examine the specimens formerly in the collection of Dr. Davis, and have now a number of them in my own collection, which were sent to me from Ohio. They are either roundish, oval, or heart-shaped, and of various sizes, but on an average six inches long, four inches wide, and from three-quarters of an inch to an inch in thickness. They weigh not far from two pounds each. These flint disks are believed to have been buried as a religious offering, and the peculiar structure of the mound which inclosed them† rather favors this view. The disks, however, represent no finished implements, but merely flat pieces, rudely chipped around their edges, and destined, in all probability, to be wrought into more symmetrical forms. Thus it would rather seem that the contents of this mound constituted a kind of depot or magazine, from which supplies of flint could be drawn whenever there was a want of that material. Many of the disks under notice bear a striking resemblance to the flint "hatchets" discovered by Boucher de Perthes and Dr. Rigollot in the diluvial gravels of the valley of the Somme,

* Also in Europe. Deposits of flint arrow-heads, for instance, were found in Scotland.—*Logan*, "*The Scottish Gael.*" Lond., 1831., Vol. I, p. 339.

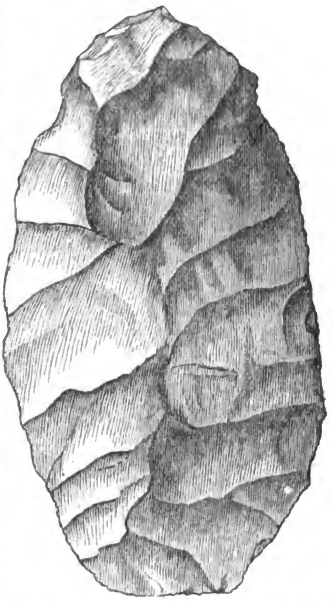
† Ancient Monuments, &c., p. 158; drawings of the disks on p. 214.

in northern France.* The similarity in form, however, is the only analogy that can be claimed for the rude flint articles of both continents, considering that they occurred under totally different circumstances. The drift implements of Europe represent the most primitive attempts of man in the art of working stone, while the Ohio disks are the unfinished specimens of a race that constructed earthworks of amazing size, and was already highly skilled in the manufacture of weapons and tools of flint.

Yet I little doubt but that implements analogous in shape as well as in associations to those of the drift of Europe, will be found also in America; for indications of the high antiquity of man on the latter continent are not wanting, and the similarity in the early condition of the human race in various parts of the globe becomes more and more manifest by the results of archæological investigation.

Another occurrence of flint disks is recorded in a notice by Dr. Hoy, published in Lapham's "Antiquities of Wisconsin," one of the Smithsonian volumes: "Some workmen, in digging a ditch through a peat swamp near Racine, found a deposit of disks of hornstone, about 30 in number. They were immediately on the clay, at the bottom of the peat, about two and a half feet below the surface. Some of the disks were quite regular; they vary from half a pound to a pound in weight." A few of these are preserved in the collection of the Smithsonian Institution.

4



About 1860, while I lived in St. Louis, a quantity of rudely-shaped flint articles of similar character were discovered close together on the bank of the Mississippi, between St. Louis and Carondelet. It is probable that the falling down of a part of the bank had exposed them to sight. I could not ascertain their number, but saw about eight of them, of which I obtained three. They are nearly all of the same size, oval in shape, and consist of whitish flint. Fig. 4 represents one of my specimens in natural size. The original is seven-eighths of an inch thick in the middle part. It is evident that they are not implements in a state of completion, but roughly-edged fragments, which were destined to be made into arrow and spear-heads at some future time. Their present convenient shape was doubtless given them for the sake of easier transportation and for saving space. It is believed that flint can be chipped more readily after having been exposed for some time to the humid influence of the earth, and this may partly account for the practice of the aborigines of burying their supplies of flint in suitable places.

* Implements very similar in shape to the Ohio disks were also found in the caves of Dordogne, especially that of Le Moustier. They are described and figured in the splendid work by Lartet and Christy, entitled "Reliquiæ Aquitanicæ."

Returning to my former subject, I will observe that the occurrence of Indian flint tools which served for agricultural purposes is not more surprising than that of other stone implements indicating less peaceable pursuits; for it is known that many of the aboriginal tribes of North America raised maize and other nutritious plants before this continent was settled by Europeans.* The production of maize, indeed, must have been considerable. Mr. Gallatin has taken some pains to ascertain the area, east of the Rocky Mountains, and north of Mexico, over which cultivation extended. It was bounded on the east by the Atlantic; on the south by the Gulf of Mexico; on the west by the Mississippi, or, more properly, by the prairies. Towards the north the limits varied according to the climate; but near the Atlantic the northern boundary of agriculture lay in the region of the rivers Kennebec and Penobscot. North of the Great Lakes agriculture was only found among the Hurons and some kindred tribes. The Ojibways, on the south of Lake Superior, and their neighbors, the Menomonies, it appears, depended for vegetable food principally on the wild rice or wild oats, called *folle avoine* by the French.† The Iroquois tribes raised large quantities of Indian corn. In the year 1687, a corps under the command of the Marquis de Nonville made an invasion into the country of the Senecas, during which all their supplies of maize were either burned or otherwise spoiled, and the quantity thus destroyed is said to have amounted to 400,000 minots, or 1,200,000 bushels.‡ Though this estimate may be somewhat exaggerated, it nevertheless shows that these tribes paid much attention to the cultivation of maize.

The nations who inhabited the large territories formerly called Florida and Louisiana, probably obtained their food mostly from the vegetable kingdom. They cultivated chiefly maize, beans, peas, pumpkins, melons, and sweet potatoes. Maize, however, was their principal produce. In the accounts of De Soto's expedition, not only frequent allusion is made to the extensive maize fields of the natives, but it may also be gathered from these relations that the army of De Soto would have starved without the supplies of Indian corn obtained from the inhabitants. These people laid up stores of that useful cereal, and among other facts it is mentioned that one of De Soto's officers found in one house alone, five hundred measures of maize ground to meal, besides a large quantity in grain.§ But those southern tribes met by De Soto and his followers in the sixteenth century were the most advanced among the North American aborigines. No longer in the pure hunter state, but attached to the soil, they lived in large villages, consisting of dwellings more commodious than those of the ruder tribes, and paid generally more attention to the comforts of life than the latter.

Adair, who spent during the last century many years as a trader in the district under notice, mentions that the French of West Florida and the English colonists obtained from the Indians different sorts of beans and peas, with which they were before entirely unacquainted. They raised also a small kind of tobacco, differing from that in use among the French and English settlers. The women, he says, planted pumpkins and different species of melons in separate fields, at a considerable distance from the towns.‖ It is even probable that the former inhabitants cultivated fruit trees. Bartram, at least, found in Georgia and Alabama, on the sites of ancient Indian settlements, various kinds of trees, such as

* Some of the facts mentioned in the following remarks were already given in my previous article, published in the Smithsonian report for 1863; I repeat them here, for the sake of greater completeness, in connection with some additional details bearing upon the same subject. For descriptions of the remarkable "garden-beds" of Michigan, Wisconsin, and Indiana, which indicate an ancient cultivation, I must refer to Schoolcraft, Lapham, and others.

† *Gallatin*, Archæologia Americana, Vol. II, p. 149.

‡ Documentary History of New York, Vol. I, p. 238.

§ *Garcilasso de la Vega*, Conquête de la Floride. Leyden, 1731, Vol. I, p. 250.

‖ *Adair*, History of the American Indians. London, 1775, p. 408.

the persimmon, honey-locust, Chickasaw plum, mulberry, black walnut, and shell-barked hickory, which, he thinks, "were cultivated by the ancients on account of their fruit, as being wholesome and nourishing food."*

The Floridians, it is stated, employed at De Soto's time prisoners of war for working the fields, and in order to prevent their escape they partly maimed them by cutting the tendons of the leg above the heel or the instep.† It appears, however, that among most semi-agricultural tribes of North America field labor was imposed upon the women; while the men, when not engaged in hunting or war expeditions, abandoned themselves to that listless repose in which barbarians generally love to indulge.

*_Bartram's_ Travels. Dublin, 1793, p. 38.
†_Garcilasso de la Vega_, Conquête de la Floride, Vol. I, p. 286, and Vol. II, p. 389.

MEMOIR OF C. F. P. VON MARTIUS.*

By Charles Rau.

The family of the celebrated botanist and ethnologist, to whose memory this sketch is dedicated, traces its origin back to Galeottus Martius, a famous physician and astrologer, born in 1427, at Narni, in Umbria. About the year 1450 he occupied a professorial chair at Padua, but, persecuted by the Inquisition on account of reformatory tendencies and compelled to leave Italy, he subsequently went to the court of the learned King Matthias Corvinus of Hungary, who appointed him his counsellor and librarian. The descendants of Galeottus mostly spread themselves over Germany, and many are known to have pursued learned professions, thus forming an ancestry worthy of their distinguished successor.

Carl Friedrich Philipp von Martius was born on the 17th of April 1794, at Erlangen, Bavaria, where his father, Ernst Wilhelm Martius, owned an apothecary establishment, holding at the same time the position of honorary professor of pharmacy in the university of that city. A man of superior general acquirements, he was especially interested in botany, and has left some writings relative to his favorite study. At the advanced age of ninety, he published an interesting and well-written book, containing recollections of his long and eventful life. He died in 1849, in his ninety-third year.

His eldest son, the subject of this sketch, was carefully educated at home and in the schools of Erlangen. At an early age he already displayed the germs of those talents which afterward made him conspicuous in the world of letters, and, when still quite young, he manifested a determined resolution to devote himself to a scientific career. Though his juvenile inclinations leaned toward natural history, he also exhibited much taste for the study of ancient classics, a tendency which, nurtured by skillful teachers, not only developed and strengthened his intellectual capacities, but also enabled him, when in after years he composed many of his writings in Latin, to express himself in that language with a precision and elegance not often met with in our time. In fact, during his whole life the reading of Latin and Greek authors formed one of his principal recreations. When only sixteen years of age, Martius was admitted, in 1810, as a student in the university of his native town. He had decided to prepare himself for the medical profession, chiefly because this study afforded him the widest field for indulging in his love for natural sciences. His favorite branch, botany, was then taught at Erlangen by a pupil of Linnæus, the learned Schreber, who does not seem, however, to have been gifted with a happy method of imparting information; hence Martius and his fellow-students felt more attracted by the lectures

* Note.—It is but fair to state that most of the facts contained in this sketch have been furnished by C. F. Meissner's *Denkschrift auf Carl Friedr. Phil. von Martius*, (Munich, 1869.) The article *Carl Philipp von Martius, sein Leben und seine Leistungen*, in the *Ausland*, (No. 38, 1869,) has also been used.

of other professors of the university, such as Hildebrandt, Harless, Goldfuss, Vogel, Wendt, and others who flourished at that period. In 1814 Martius received the diploma of *doctor medicinæ*, having passed with honors the examination necessary to obtain that grade. His inaugural dissertation was a critical catalogue of the plants in the botanical garden of Erlangen.* In this first literary attempt, which forms an octavo volume of 210 pages, he followed the classification of Linnæus. Shortly afterward we find Martius among the *élèves* of the Royal Academy of Sciences at Munich, deeply engaged in botanical studies, and appointed assistant to Schrank, the conservator of the botanical garden. An excellent opportunity being thus offered to the young botanist of enlarging the knowledge already acquired, he devoted himself with enthusiastic zeal to a pursuit that harmonized so well with his taste. While in this position he published his *Flora Cryptogamica Erlangensis*, (*Norimbergæ*, 1817,) a work already begun at Erlangen, which embraced his first independent investigations, and attracted by its merits considerable attention from competent botanists. His superior talents, combined with an indefatigable industry and excellent personal qualities, could not fail to endear him to the older members of the Academy, men eminent in their special departments of science, who exerted a most beneficial and lasting influence on his mind. Indeed, he was placed in an enviable position; fortune smiled on him and smoothed his path to distinction. One circumstance, however, must be particularly mentioned in this place; for it is that on which his future success in life chiefly depended. The King of Bavaria, Max Joseph I, an ardent lover of botany, frequently visited the botanical garden of his capital, on which occasions he usually selected Martius for his companion and guide. Thus becoming acquainted with the young naturalist's acquirements and talents, he honored him with his special favor, and seized upon the first opportunity of showing his good will in a practical manner. This excellent monarch had for some time conceived the plan of sending scientific explorers to South America, and in 1815 he had already conferred with the Academy in relation to this matter; yet two years elapsed before the realization of his design. In 1817, when the Austrian Archduchess Leopoldina, the bride of the crown-prince of Brazil, afterward Emperor Dom Pedro I, was about to depart for the New World, Metternich caused some Austrian savants, charged with scientific labors in Brazil, to be added to the suite of the princess. The Bavarian government, wishing to profit by this occasion, asked, and was granted, permission to send in the same vessel two naturalists, who, upon their arrival in South America, were to carry on their investigations independently of the Austrian corps. For this purpose Max Joseph selected as botanist his gifted protegé Martius, then a young man of twenty-three, and Johann Baptist von Spix, a member of the Academy, who was to take charge of the zoological department. On the 2d of April, 1817, the party left the harbor of Trieste in the Austrian frigate Austria, and touching at Malta, Gibraltar and Madeira, reached Rio Janeiro, after a prosperous voyage, in the middle of July. One may easily imagine the feelings of the two travelers, especially of the youthful and enthusiastic Martius, when they stood upon the soil of the wonderful country that lay before them with all its treasures of nature—the very El Dorado of a naturalist, then far less explored than at the present time, and promising the richest harvest in every field of natural science.

On the 8th of December, 1817, the two Bavarian savants set out on their expedition into the interior. Having first visited the province of

* *Plantarum Horti Academici Erlangensis Enumeratio. Erlangæ*, 1814.

San Paolo, they passed in a northeasterly direction through the province of Minas Geraës as far as Minas Novas; then through the Serra Diamantina, touching the province of Goyaz, when they turned again toward the northeast and proceeded to San Salvador, the capital of the province of Bahia. They arrived there in November 1818. After a short sojourn at this place, and having visited the Botocudos and other adjacent Indian tribes, they continued their journey toward the north, traversing the provinces of Pernambuco, Piauhy, and Maranhão, until they reached San Luiz, situated at the mouth of the Itapicurú. From there they went by sea to the estuary of the Amazon River, arriving at Para in June 1819. They then ascended this mighty stream for more than two-thirds of its length, as far as Tabatinga, close to the frontier of Peru. The travelers having separated for awhile to visit different parts of this region, Martius explored one of the tributaries of the Amazon, the Rio Japurá, (Yupurá) until he arrived at the cataract Salto Grande de Araracoara, which impeded a further advance. The larger affluents of the great river, the Rio Negro and Rio Madeira, were likewise explored some distance, the latter as far as the districts of the Mundrucú and Mauhé Indians. It must be remembered that the navigation of those waters, which is now greatly facilitated by steam vessels, had then to be performed in hired or purchased boats, which, being manned with Indian rowers, afforded hardly room for the travelers and their ever increasing luggage, and offered no other protection against the burning equatorial sun and the heavy rains but a slight cover constructed of boughs. Amid a multitude of inconveniences, and sometimes exposed to real danger, they had to keep their journals, and to prepare and preserve the natural objects obtained during their excursions on the banks; yet the collections they brought back, which now enrich the museums of Munich, bear evidence of their great success.* Descending the Amazon, they arrived again in Para in the middle of April 1820. Two months afterward they embarked for Lisbon, and reached Munich in December 1820, after an absence of nearly four years.

The expedition of Spix and Martius certainly ranks among the most important enterprises undertaken for scientific purposes in this century. Their explorations extended over a distance of nearly one thousand four hundred geographical miles, and have, like the travels of Alexander von Humboldt, furnished the material for numerous works embracing many departments of science; indeed, the period of nearly half a century, which has elapsed since the return of the naturalists, was not sufficient for fully developing, and giving to the scientific world, all results of their researches. Since La Condamine descended the Amazon, Spix and Martius were the first learned Europeans who visited those mighty waters; and though others had previously explored certain portions of Brazil, the country, on the whole, still remained comparatively unknown. Hence the importance of the Bavarian expedition. The names of Spix and Martius are intimately connected with the natural history and ethnology of the empire, and will be gratefully remembered in future times by all those who take a scientific interest in that country, or wish to inform themselves concerning its condition in the early part of our century.

* Besides valuable mineralogical and geological specimens, their collections embraced: mammals, 85 species; birds, 350; amphibia, 130; fishes, 116; insects, 2,700; arachnidae and crustaceans, each 50; plants, about 6,500. The latter, mostly represented by several specimens and carefully preserved, constitute now the most valuable portion of the royal herbarium at Munich. The botanical garden also received its share, partly in living plants, partly in such as were raised from the collected seeds. The whole was placed under the care of the Academy.

The Brazilian voyage laid the foundation of Martius' future success. On the very day of their return, he and Spix were decorated by the King with the civil order of Bavaria, and shortly afterward Martius was elected a member of the Royal Academy, and appointed second conservator of the botanical garden. At the age of twenty-six Martius already enjoyed a reputation which, in common life, is usually only acquired by men of riper years; for not many are favored with advantages such as were offered to him. His sojourn in a country perfectly new to him, and hence the necessity of acting independently, had made him self-reliant and practical, while the number of objects constantly claiming his attention had served to quicken his power of perception, and to develop all those qualities which, when combined, constitute the true naturalist. His experiences in the wilds of Brazil were to him a far better school than many years spent in constant closet-study.

His return from Brazil marked the beginning of a long-continued literary activity, resulting in highly important works, to which reference will be made hereafter. As an event of this period we have also to record his marriage with an accomplished lady of noble descent, a union which gave him a home and a family, and promoted in no small degree the happiness of his existence. The domestic circle was to him throughout life an asylum of peace and contentment, where he rested from his professional labors, enjoying the society of his family and of numerous friends who loved to gather under his hospitable roof. A great change occurred in Martius' position in the year 1826, when King Ludwig I, who had ascended the throne of Bavaria, transferred the university of Landshut to Munich, and appointed him professor of botany. Six years later, the first conservator of the botanical garden, Von Schrank, being then very old, retired from office, and Martius was installed in his place. He was eminently qualified for discharging the duties now incumbent on him. Perfectly acquainted with his science, he possessed the faculty of presenting it in an easy and attractive manner. He spoke with elegance and fluency, and sometimes, when carried away by the subject, his eloquence even partook of a poetical character. For practical demonstration the botanical garden, carefully superintended by Martius, and the herbarium, afforded ample means, to which must be added frequent botanical excursions undertaken in company with the students, with whom he entertained very amicable relations, gaining their affections no less by conscientious instruction than by the benevolent, paternal friendship he bestowed on them. Among the number of his pupils who became prominent, may be named Alexander Braun, Hugo von Mohl, Carl Schimper, O. Sendtner, C. H. Schultz-Bipontinus, and Spring.

In 1840 Martius was elected secretary of the physico-mathematical class of the Academy, an honorary office imposing much labor, which he performed until his death with care and punctuality, and great advantage to that scientific body. By this position he was charged with all correspondence and literary exchanges with other learned institutions, and whenever a foreign or resident member of the Academy died it was his duty to deliver an address commemorative of the life and merits of the deceased. These eulogies have been much admired for the excellent style in which they are composed, and the skill displayed in the general treatment. They are deemed fully equal to the celebrated *éloges* by Cuvier and Flourens.*

* The eulogies read by Martius are contained in an octavo volume of 619 pages, entitled *Akademische Denkreden von C. F. Ph. von Martius*, (*Leipzig*, 1866.) Those of a later date (on Faraday, Brewster, Flourens, &c.) were published in the transactions of the Academy of the year 1868.

For the rest, the professional career of Martius is not marked by any striking incidents. Lectures, literary labors, and the superintendence of the botanical garden fully occupied his time, and his travels, after the American voyage, extended not farther than France, Belgium, Holland, England, and Switzerland. He used to spend his summer vacations in the picturesque Bavarian mountains, especially at Schlehdorf, on the Kochel-See, where his hospitable house formed a rallying-place for his numerous friends, who remember with feelings of gratitude the days passed there amid delightful natural scenes and in a highly intellectual, refined society. Though of a vigorous constitution, Von Martius was in later years subject to those chronic indispositions which usually result from the sedentary habits of men of letters, and he found himself therefore obliged to resort repeatedly to watering places, especially to the mineral springs of Kissingen. The salutary effect derived from the use of these waters was in some measure counteracted by the bustle and distractions peculiar to such localities; for, meeting there distinguished friends, and being, moreover, naturally inclined to social life, the mental excitement produced was rather unfavorable to the improvement of his physical condition.

In the year 1854 an unexpected event caused the premature termination of Martius' official activity. It was decided by the government that the glass building for the industrial exhibition then to be held at Munich should be erected within the area of the botanical garden, which had but lately undergone great improvements at a sacrifice of much time and labor. It was in vain that Martius remonstrated against a measure which threatened his beloved institution with serious disadvantages, and when he found his objections unavailing, he finally resigned, deeply disappointed, both his professorship and the superintendence of the botanical garden.

The literary activity of Professor Von Martius was very great. The writer has in his possession a printed list of his works and minor writings, which embraces no less than one hundred and sixty titles. A number of these publications are written in the Latin language, and most of them, of course, relate to botany, his specialty in science; but there are also valuable contributions to ethnology among them. In treating of his merits as an author, it is proper to mention first the narrative of the Brazilian voyage performed by him and Spix.* This is a substantial and most carefully prepared work, in three quarto volumes, accompanied by an atlas of large size. The volumes appeared respectively in 1823, 1828, and 1831; Spix, however, died in 1826, and hence the two last volumes were almost entirely written by Martius alone. Every one who examines this work must be struck by the vast amount of varied information it contains, for the travelers directed their attention not merely to the natural history of Brazil, but investigated also with searching care everything else within their reach which they deemed worthy of inquiry. The nature of the country, its productions, different races, social condition, commerce, agriculture, mining, statistics, &c., are treated with a surprising minuteness, and, where the subject is of an elevated character, in a superior style, which has repeatedly

* *Reise in Brasilien, auf Befehl Sr. Majestät Maximilian Joseph I, Königs von Bayern, in den Jahren* 1817, 1818, 1819 *und* 1820 *gemacht, und beschrieben von J. B. von Spix und C. F. Ph. von Martius.* Three vols., 4to; Munich, 1823–31; with an atlas.

There is an English translation of the first volume by H. E. Lloyd; London, 1824, 2 vols., 8vo.; plates reduced to the size of the volumes.

elicited the praise of Goethe, the great master of German composition. In fact, certain portions of the work, such as give the impressions produced upon the travelers by the sublime natural scenes of Brazil, have passed into collections containing model pieces of German prose.* The large atlas, ornamented with a well-executed allegorical title-page, comprises maps, orographical diagrams, panoramic views of mountain chains, landscapes, representations of typical animals and plants, and quite a number of plates illustrating the domestic and hunting life, the feasts, dances, and ceremonies of the aboriginal inhabitants. Their fabrics and arms are figured on two plates. In addition, there are many faithfully executed, large portraits of Indians of various tribes, exhibiting their peculiar features and the curious manner in which they disfigure their ears, lips, and chins by the insertion of ornaments. Of particular interest are some plates containing representations of figures sculptured on rocks, as affording the means of comparing the pictography of the Brazilian aborigines with that of other indigenous inhabitants of the American continent.

On the whole, the narrative of Spix and Martius is one of the most important and comprehensive works of travel published in modern times, equaling in merit the researches of Humboldt relative to Mexico and other parts of America. It will remain a lasting monument of the zeal and perseverance of its authors, and an honorable testimonial to the enlightened prince who brought about its realization.

Simultaneously with the account of their travels, Spix and Martius began to prepare their strictly scientific works on the botany and zoology of Brazil; the former department, of course, being in charge of Martius, while Spix treated the subject of zoology. But as Spix had

* We cannot refrain from inserting here, as a specimen, the description of evenings spent at the country house of Mr. Von Langsdorff, near Rio Janeiro:

"Nothing can be compared to the beauty of this retreat when the most sultry hours of the day are past, and gentle breezes, impregnated with balsamic perfumes from the neighboring wooded mountains, cool the air. This enjoyment continues to increase as the night spreads over the land and the sea, which shines at a distance, and the city, where the noise of business has subsided, is gradually lighted. He who has not personally experienced the enchantment of tranquil moonlight nights in these happy latitudes can never be inspired, even by the most faithful description, with those feelings which scenes of such wondrous beauty excite in the mind of the beholder. A delicate, transparent mist hangs over the country, the moon shines brightly amidst heavy and singularly grouped clouds; the outlines of the objects which are illuminated by it are clear and well defined, while a magic twilight seems to remove from the eye those which are in the shade. Scarce a breath of air is stirring, and the neighboring mimosas, that have folded up their leaves to sleep, stand motionless beside the dark crowns of the manga, the jaca, and the ethereal jambos; or sometimes a sudden wind arises, and the juiceless leaves of the acaju rustle, the richly flowered grumijama and pitanga let drop a fragrant shower of snow-white blossoms; the crowns of the majestic palms wave slowly over the silent roof which they overshade, like a symbol of peace and tranquillity. Shrill cries of the cicada, the grasshopper, and the tree-frog make an incessant hum, and produce by their monotony, a pleasing melancholy. A stream, gently murmuring, descends from the mountains, and the macuc, (*Perdrix guyanensis,*) with its almost human voice, seems to call for help from a distance. Every quarter of an hour different balsamic odors fill the air, and other flowers alternately unfold their leaves to the night, and almost overpower the senses with their perfume; now it is the bowers of paullinias, or the neighboring orange grove, then the thick tufts of the cupatoria, or the bunches of the flowers of the palms, suddenly bursting, which disclose their blossoms, and thus maintain a constant succession of fragrance. While the silent vegetable world, illuminated by swarms of fire-flies, as by a thousand moving stars, charms the night by its delicious effluvia, brilliant lightnings play incessantly in the horizon and elevate the mind in joyful admiration to the stars, which, glowing in solemn silence in the firmament above the continent and ocean, fill the soul with a presentiment of still sublimer wonders. In the enjoyment of the peaceful and magic influence of such nights, the newly-arrived European remembers with tender longings his native home, till the luxuriant scenery of the tropics has become to him a second country."—(English translation, vol. i, p. 160.)

died in 1826, the assistance of Agassiz, Perty, and Andreas Wagner was required to continue the zoological labors, which resulted in the publication of several folios with beautifully executed plates. We mention the following:

New species of Brazilian monkeys and bats, by Spix.* New species of lizards, snakes, turtles, and frogs, by Spix.† New species of birds, by Spix.‡ Fluviatile testaceans, by J. A. Wagner.§ Fishes, by Agassiz.‖ Insects, by Perty.¶

In treating of the Brazilian flora,** Martius first confined himself to a selection of the plants collected by him, which he described in two works, entitled *Nova Genera et Species Plantarum Brasiliensium*†† and *Icones Selectæ Plantarum Cryptogamicarum Brasiliæ.*‡‡ In the preparation of the first volume of the first-named work, which describes the phanerogamous plants, he was assisted by his too-early-deceased colleague Zuccarini. The object of the *Icones Selectæ*, *&c.*, is indicated in the title. To the latter work Hugo von Mohl contributed an excellent treatise on the structure of the stems of tree-ferns. Both works are highly esteemed. They contain full and precise descriptions of single plants as well as of whole series and groups of kindred species; and it is particularly worthy of notice that many of these monographic treatises have laid the foundation of a thorough knowledge of the plants to which they relate. The drawings of whole plants and their anatomical details are executed with a degree of faithfulness and art surpassing almost anything of a similar character that had previously appeared in the literature of botany.

As early as 1823 Martius began the publication of his "Natural History of Palms,"§§ a work which is considered his most important contribution to botany, and that by which he has most conspicuously linked his name for future times with that science. At the first sight of these majestic trees, which Linnæus already had designated as the "princes of the vegetable kingdom," he conceived the plan of making them the object of his special observation and scientific treatment. He, therefore, studied with attention the many species of palms he saw during his travels in Brazil, and collected after his return from that country with the utmost diligence all the material concerning the palms of other parts of the world, which was required to render his work complete. He thus succeeded, after the labor of many years, in producing a monograph unique in its kind, which caused Alexander von Humboldt to exclaim, "As long as palms are known and mentioned, the name of

* *Simiarum et Vespertilionum Brasiliensium Species Novæ. Ed. J. B. de Spix. Monachii*, 1823. Large folio, with 38 colored plates.

† *Animalia Nova, s. Species Novæ Lacertarum, Serpentum, Testudinum, Ranarum, quas in Itinere per Brasiliam a.* 1817–'20 *suscepto, collegit et descripsit J. B. de Spix. Monachii*, 1824–'39. Folio, with 95 colored plates.

‡ *Avium Species Novæ quas in Itinere per Brasiliam a.* 1817–'20 *suscepto collegit et descripsit J. B. de Spix. Monachii*, 1824–'25. Two volumes folio, with 115 and 118 colored plates.

§ *Testaceæ Fluviatilia quæ —— —— collegit J. B. de Spix, descripsit J. A. Wagner, edd. F. a Paula de Schrank et C. F. P. de Martius. Monachii*, 1827. Folio, with 29 colored plates.

‖ *Selecta Genera et Species Piscium quos —— —— collegit et pingendos curavit J. B. de Spix, digessit L. Agassiz*, ed. *Martius. Monachii*, 1829. Folio, with plates.

¶ *Delectus Animalium Articulatorum quæ —— —— collegerunt Spix et Martius, descripsit Max. Perty, ed. Martius. Monachii*, 1830–'34. Folio, with 40 colored plates.

** Not being a botanist himself, and consequently unacquainted with most of the works mentioned hereafter, the writer keeps closely to the statements given by Professor Meissner in his *Denkschrift*.

†† *Monachii*, 1823–'30. Three volumes folio, with 300 colored plates.

‡‡ *Monachii*, 1826–'31. Small folio, with 76 colored plates.

§§ *Historia Naturalis Palmarum. Monachii*, 1823–'50. Three volumes imperial folio, with 245 plates, partly colored.

Martius will not be forgotten!" Certain specialties embraced in this large work were treated by skillful co-laborers: the anatomy, by H. von Mohl; the fossil palms, by Unger; and a part of the morphology by Alexander Braun and O. Sendtner.

While the preceding works were commenced and in progress, Martius entered upon another literary undertaking of still larger extent, namely, the systematic enumeration and description of the whole flora of Brazil. But as a labor of such magnitude could not be carried out without the assistance of persons in high stations, the patronage of King Ludwig I, of Bavaria, and of the Emperor of Austria, Ferdinand I, was successfully solicited, and the work commenced under their auspices.* The Emperor Dom Pedro II, of Brazil, afterward united his aid to that of the two German sovereigns. At the outset Martius had secured the co-operation of competent botanists, each of whom was to take charge of a certain portion of the work; and their united efforts resulted in the publication of the *Flora Brasiliensis*,† one of the greatest literary achievements of our time. The work was commenced in 1840, and though yet far from completion, already consists of forty-seven parts, with more than *eleven hundred* plates in folio. Notwithstanding the ample material which Martius had at his command, the researches necessary to arrive at full and satisfactory results extended over many botanical collections of Europe, and everything in the shape of manuscripts and drawings bearing on the subject was critically examined and used when found available. The immense work connected with the editing of the *Flora* prevented Martius from participating conspicuously in the botanical labors themselves; yet he has furnished two entire monographs (Anonaceæ and Agaveæ) and many highly valuable additions relating to the geographical distribution and the use of the plants described. In view of the important bearing of this publication upon the development of the vegetable resources of Brazil, the ambassador from that country to the court of Vienna lately spent some time at Munich, in order to confer with Professor Von Martius concerning the completion of the work. The Brazilian government agreed to pay 100,000 florins for that purpose; but as Martius was already far advanced in years, he thought it expedient to appoint, in the person of Dr. Eichler, a successor to superintend the publication in case of his decease. Thus the work will suffer no interruption.‡

* It must not be left unnoticed that the patronage of the Emperor of Austria in this case was owing to the influence of Prince Metternich. This much-abused statesman, it is well known, took a lively interest in the promotion of science. His letters to A. von Humboldt, contained in the correspondence between Humboldt and Varnhagen von Ense, bear witness to the fact.

† *Flora Brasiliensis, s. Enumeratio Plantarum in Brasilia hactenus detectarum quas — — ediderunt C. F. Ph. de Martius et St. L. Endlicher. Vindob. et Lips.*, 1840–'69, *fasc.* 1–47, *folio* . The first nine parts were edited by Martius and Endlicher; the rest, after Endlicher's death, by Martius alone.

‡ Of Martius' numerous less extensive publications relating to botany we will mention only the following:

Herbarium Floræ Brasiliensis. Monachii, 1837–40.—*Systema Materiæ Medicæ Vegetabilis Brasiliensis.* (8°: Leipzig, 1843.) This is a systematically arranged enumeration of the plants used for medicinal purposes by the inhabitants of Brazil. The preparation, manner of application, and effects are carefully described. This work has been translated into the Portuguese language by H. Velloso d'Oliveira. Rio de Janeiro, 1854.

Specimen Materiæ Medicæ Brasiliensis (in vol. ix, of the Memoirs of the Academy of Sciences.) A number of articles likewise relating to the medicinal plants of Brazil and their uses were published in *Buchner's Repertorium der Pharmacie.*

Worthy of especial mention is a publication on the potato-rot: *Die Kartoffel-Epidemie der letzten Jahre* (Munich, 1843. 4°. With plates.) Martius was the first who noticed in the diseased fruit a microscopic fungus, called by him *Fusisporium solani.* He accounted for the spreading of the rot by the transmission of the spores of that fungus to sound potatoes.

Having given some account of Martius' more important botanical labors, we will briefly allude to his great merits as an ethnologist. During his travels in South America he became deeply interested in the aboriginal tribes, and collected, in conjunction with his traveling companion, many valuable facts relating to their mode of life, relationship, languages, migrations, &c. It has already been stated that a considerable portion of the "Travels in Brazil," by Spix and Martius, is devoted to the ethnology of that country. Martius, however, published subsequently several valuable treatises relating to ethnological subjects, which will be mentioned hereafter; but his most important ethnological work, entitled *Beiträge zur Ethnographie und Sprachenkunde Amerikas, zumal Brasiliens*, (Leipzig, 1867,)* which was published shortly before his death, and therefore contains his matured views, deserves particular notice. The *Beiträge* comprise two octavo volumes, the first of 802, the second of 548 pages. An ethnographic map is added to the first volume. Its contents are:

1. *Die Vergangenheit und Zukunft der amerikanischen Menschheit*,† a lecture delivered in 1838, at a meeting of German naturalists and physicians, and first published in 1839.

2. A republication of the admirable treatise *Von dem Rechtszustande unter den Ureinwohnern Brasiliens*,‡ first published in 1832. This is certainly one of the most interesting essays ever written on American ethnology, although Martius' view of a degeneration of the Brazilian Indians from a higher state of civilization may be contrary to the opinions of many anthropologists.

3. The remainder of the volume (pp. 145–801) is taken up with a description of the native tribes who inhabit Brazil and the adjacent regions. It is minute, accurate, and vivid, much more full than Waitz, and enriched by numerous personal observations. Martius is a believer in the gradual extension of the Tupi language and blood from the headwaters of the La Plata northward, quite to the Antilles and Bahamas.§

The second volume, entirely devoted to South American languages, contains over a hundred vocabularies, which are arranged in allied groups exhibiting the affinity of tongues. Being of the utmost importance in tracing the relationship of nations, they furnish highly valuable material to the student of American ethnology. Many of these vocabularies are from manuscript sources. In rendering the aboriginal words the Latin, Portuguese, German, and French languages have been employed. The articles *Pflanzennamen in der Tupi-Sprache*‖ and *Thiernamen in der Tupi-Sprache*,¶ first printed, respectively, in 1858 and 1860, are republished with additions in this volume.

Besides the above-mentioned ethnological essays reprinted in the *Beiträge*, Martius, as stated, has left some other contributions of kindred character, which appeared in periodical publications. We give here the following titles translated into English: On the sculptures on Mount Gabia," near Rio Janeiro.** On Buschmann's work—"The traces of the

* Contributions to the ethnography and philology of America, especially of Brazil.
† The past and future of the American race.
‡ On the civil and social condition of the aborigines of Brazil.
§ In a letter which Martius addressed, shortly before his death, to Dr. D. G. Brinton, of Philadelphia, he expresses himself on this point even more decidedly than in the *Beiträge*.
‖ Names of plants in the Tupi language.
¶ Names of animals in the Tupi language.
** *Ueber die Sculpturen auf dem Berge Gabia bei Rio de Janeiro.* (*Gelehrte Anzeigen*, 1843, *Nos.* 38, 39.)

Aztec language in Northern Mexico."* The physical condition, diseases, physicians, and remedies of the aborigines of Brazil.† On the preparation of the arrow-poison Urari among the Juri Indians on the Rio Yupurá, in North Brazil.‡ The creation of the Negro: a Brazilian legend.§

The time intervening between Professor Von Martius' retirement from official duties in 1854 and his death was to him no period of repose;‖ on the contrary, having now more leisure at his command, he devoted himself exclusively to scientific labors. Much of his time was taken up in editing the *Flora Brasiliensis*, and his position as secretary of the Royal Bavarian Academy demanded his constant care and attention. Only one year before his death, at the age of seventy-four, he published the *Beiträge*, his most important contribution to American ethnology.

He was one of those few whose merits are duly acknowledged and appreciated during their life-time. He maintained intimate relations with many of the most distinguished men of our time, and most learned societies of note counted him among their members. Numerous works are dedicated to him; his name is perpetuated in the scientific denominations of plants and animals; even a mountain in New Zealand, Mount Martius, is called after him. Medals were struck in his honor, and crowned heads manifested their esteem by decorating him with the insignia of their orders.

Martius enjoyed the full possession of his mental faculties to the last moment of his life, and even his physical appearance betokened no considerable degree of decline; it was only during the years immediately preceding his death that his altered features and somewhat stooping figure indicated the changes which advanced age will produce upon the strongest constitution. But the lively expression of his eye, his animated conversation, and the interest he took in everything that passed around him, gave evidence of his unimpaired mental vigor. In the fall of 1868, being then in his seventy-fifth year, he made a journey to Berlin and Dresden to visit his son and his old friends. He returned in good health, and nothing intimated his approaching end. But shortly afterward, having been exposed to a severe storm, he was attacked by a febrile indisposition, which, increasing, developed itself into inflammation of the lungs. His strength sank rapidly, and on the 13th of December, 1868, after an illness of nine days, his earthly career was closed by an easy death. Fresh palm leaves decorated, significantly, the coffin in which his mortal remains were conveyed to their last place of rest.

---

* *Ueber Buschmann's Werk: Die Spuren der Aztekischen Sprache im nördlichen Mexiko.* (*Gel. An.*, 1860, *Nos.* 41–43.)

† *Das Naturell, die Krankheiten, das Arzthum und die Heilmittel der Urbewohner Brasiliens.* (*Buchner's Repertorium der Pharmacie*, vol. 33, p. 289, &c.)

‡ *Ueber die Bereitung des Pfeilgiftes Urari bei den Indianern Juris am Rio Yupurá in Nordbrasilien.* (*Buchner's Rep. d. Pharm.*, vol. 36, 1830, p. 337, &c.)

§ *Die Erschaffung des Negers, eine Brasilianische Volks-Sage.* (*Augsburger Allgem. Zeit.*, 1839.)

‖ "*Der Ruhestand war für ihn kein Stand der Ruhe.*"—Meissner's *Denkschrift*, p. 24.

ANCIENT ABORIGINAL TRADE IN NORTH AMERICA.

By Charles Rau.

The following essay was published in German, Vol. V of the *Archiv für Anthropologie* (Braunschweig, 1872); but as the subject is purely North American in character, the author has deemed it proper to prepare a version in the language of the country to which it refers. The present reproduction, however, is enlarged and improved.

CONTENTS.

INTRODUCTION.

Indications are not wanting that a kind of trade or traffic of some extent existed among the prehistoric inhabitants of Europe, even at a time when they stood comparatively low in the scale of human development. The same practice prevailed in North America, before that part of the new world was settled by Europeans; and as the the subject of primitive commerce is of particular interest, because it sheds additional light on the conditions of life among by-gone races, I have collected a number of data bearing on the trade-relations of the former inhabitants of North America. The fact that such a trade was carried on is proved, beyond any doubt, by the frequent occurrence of Indian manufactures consisting of materials which were evidently obtained from far distant localities. In many cases, however, these manufactures may have been brought as booty, and not by trade, to the places where they are found in our days. The modern Indians, it is well known, sometimes undertook expeditions of a thousand or twelve hundred miles, in order to attack their enemies. The warlike Iroquois, for example, who inhabited the present State of New York, frequently followed the war-path as far as the Mississippi river. Thus, in the year 1680, six hundred warriors of the Seneca tribe invaded the territory of the Illinois, among whom La Salle sojourned just at that time, preparing to descend the Mississippi to the Gulf of Mexico.* More than a hundred years ago, the traveler

* Morgan, League of the Iroquois, Rochester, 1851, p. 13. More precise information concerning this memorable expedition is to be found in the writings of Hennepin, Membré, Lahontan, and others.

Carver learned from the Winnebagoes (in the present State of Wisconsin) that they sometimes made war-excursions to the southwestern parts inhabited by Spaniards (New Mexico), and that it required months to arrive there.* Similar excursions and migrations, of course, took place during the early unknown periods of North American history. In the course of such enterprises the property of the vanquished naturally fell into the hands of the victors, who appropriated everything that appeared useful or desirable to them. The consequence was an exchange by force—if I may call it so—which caused many of the manufactures and commodities of the various tribes to be scattered over the face of the country. This having been the case, it is, of course, impossible to draw a line between peaceable barter and appropriation by right of war, and, therefore, while employing hereafter frequently the terms "trade" or "exchange," I interpose that reservation which is necessitated by the circumstances just mentioned.

Of the Indian commerce that has sprung up since the arrival of the Europeans I shall say but little, considering that this subject has sufficiently been treated in ethnological and other works on North America; and I shall likewise omit to draw within the sphere of my observations that interesting trade which was, and still is, carried on between the tribes inhabiting the high north of Asia and America, where Behring's Strait separates the two continents. My attention is chiefly directed to the more ancient manufactures occurring in Indian mounds and elsewhere; and the distribution of these relics over distant parts of the country, in connection with the known or presumed localities which furnished the materials composing them, forms the basis of my deductions. Thus, my essay will assume an *archæological* character, and for this reason I shall confine my remarks to that part of the United States concerning whose antiquities we possess the most detailed information, namely, the area which is bounded by the Mississippi valley (in an extended sense), by the Great Lakes, the Atlantic coast, and the Gulf of Mexico.

A number of archæologists make a distinction between the builders of the extensive mural earthworks and tumuli of North America and the tribes whom the whites found in possession of the country, and consequently separate the relics of the so-called mound-builders from those of the later inhabitants. Such a line of demarcation certainly must appear totally obliterated with regard to the relations which I am about to discuss, for which reason I shall by no means adhere to this vague division in my essay, but shall only advert to the former Indian population in general.

In the following sections I have first treated of a number of materials which formed objects of trade, either in an unwrought state or in the shape of implements and ornaments; and subsequently, in conclusion, I have made some observations tending to add more completeness to my preceding statements.

* Carver, Travels, &c., Harper's reprint, New York, 1838, p. 42.

COPPER.

Every one knows that the region where Lake Superior borders on the northern part of Michigan abounds in copper, which occurs here in a native state and in immense masses, the separation of which and raising to the surface contribute in no slight degree to the difficulties of the mining process. Long before Europeans penetrated to those parts, the aborigines already possessed a knowledge of this wealth of copper. This fact became known in 1847, at which time the traces of ancient aboriginal mining of some extent were pointed out in that district. The circumstances of this discovery and the means employed by the natives for obtaining the copper being now well known, a repetition of those details hardly would be in place, and I merely refer to the writings relating to this subject.*

Copper was, indeed, the only metal which the North American tribes employed for some purposes before their territories were colonized by Europeans. Traces of wrought silver have been found, but they are so exceedingly scanty that the technical significance of this metal hardly can be taken into consideration. Gold was seen by the earliest travelers in small quantities (in grains) among the Florida Indians;† yet, to my knowledge, no object made of gold, that can with certainty be attributed to the North American Indians, has thus far been discovered.‡ The use of copper, likewise, was comparatively limited, and cannot have exerted any marked influence on the material development of the natives. The copper articles left by the former inhabitants are by no means abundant. As an example I will only mention that, during a sojourn of thirteen years in the neighborhood of St. Louis, which is particularly rich in tumular structures and other tokens of Indian occupancy, I did not succeed in obtaining a single specimen belonging to this class. Copper implements, such as axes, chisels, gravers, knives, and points of arrows and spears, have been found in the Indian mounds and in other places; but most of the objects made of this metal served for ornamental purposes, which circumstance alone would go far to prove that copper played but an indifferent part in the industrial advancement of the race. If the ancient inhabitants had understood the art of melting copper, or, moreover, had nature furnished them with sufficient supplies of tin ore for producing

* Squier and Davis, Ancient Monuments of the Mississippi Valley, Smithsonian Institution, Washington, 1848. Foster and Whitney, Report on the Geology and Topography of the Lake Superior Land District, Part I, Washington, 1850. Schoolcraft, Indian Tribes of the United States, Vol. I, Philadelphia, 1851. Lapham, The Antiquities of Wisconsin, Washington, 1855. Whittlesey, Ancient Mining on the Shores of Lake Superior, Washington, 1863. Sir John Lubbock, Prehistoric Times, London, 1865, &c.

† See: Brinton, Notes on the Floridian Peninsula, Philadelphia, 1859, Appendix III.

‡ In the Smithsonian Report for 1870, just published, the occurrence of gold beads in a mound near Cartersville, in the Etowah valley, Georgia, is recorded. Native gold is said to be found in the neighborhood, (p. 380.)

bronze, that peculiar composition which the Mexicans and Peruvians employed, their state of civilization doubtless would have been much higher when the whites arrived in their country. They lacked, however, as far as investigations hitherto have shown, the knowledge of rendering copper serviceable to their purposes by the process of melting, contenting themselves by hammering purely metallic masses of copper with great labor into the shapes of implements or articles of decoration. These masses they doubtless obtained principally, if not entirely, from the copper districts of Lake Superior.* Owing to the arborescent or indented form under which the copper occurs in the above-named region, nearly all copper articles of aboriginal origin exhibit a distinct laminar structure, though quite a considerable degree of density has been imparted to the metal by continued hammering. It must be admitted, furthermore, that the aborigines had acquired great skill in working the copper in a cold state. From an archæological point of view this peculiar application of natural copper is certainly very remarkable, and, therefore, has often been cited, both by American and European writers. To the native population, however, the comparatively sparing use of copper cannot have afforded great material aid, and its chief importance doubtless consisted in the promotion of intercourse among the various tribes.

The first travelers who visited North America saw copper ornaments and other objects made of this metal in the possession of the natives, and very scrupulously mention this fact in their accounts, while they often leave matters of greater importance entirely unnoticed. This cannot surprise us, considering that the first discoverers were possessed of an immoderate greediness for precious metals, and therefore also paid particular attention to those of less value. The Florentine navigator, Giovanni Verazzano, who sailed in 1524, by order of Francis the First of France, along the Atlantic coast of North America for purposes of discovery, noticed, as he states in his letter to the French king, on the persons of the natives pieces of wrought copper, "which they esteemed more than gold." Many of them wore copper ear-rings.† In the narrative which the anonymous Portuguese nobleman, called the Knight of Elvas, has left of De Soto's ill-fated expedition (1539–'43) it is stated that the Spaniards saw, in the province of Cutifachiqui, some copper axes, or chopping-knives, which apparently contained an admixture of gold. The Indians pointed to the province of Chisca as the country where the people were familiar with the process of melting copper or another

* Some of the natives of the northernmost part of the United States, lately purchased from Russia, worked copper before the European occupation. Their industry was, of course, entirely independent of that here under consideration. (See, for instance, Von Wrangell, *Russische Besitzungen an der Nordwestküste von Amerika*, St. Petersburg, 1839.)

† The Voyage of John de Verazzano, in Collections of the New York Historical Society, Second Series, Vol. I, New York, 1841, pp. 47 and 50.

metal of a lighter color and inferior hardness.* It is very natural that these gold-seeking adventurers should have anticipated everywhere traces of that valuable metal; and concerning the statements of the Indians in relation to the melting, it is well known how apt the crafty natives always were to regulate their answers according to the wishes of the inquirers. Yet, notwithstanding these improbabilities, the fact remains that the natives of the present Southern States used implements of copper some centuries ago. Indeed, I have seen in the collection of Colonel Charles C. Jones, of Brooklyn, copper articles of the above description, obtained in the State of Georgia. When Henry Hudson discovered, in 1609, the magnificent river that bears his name, he noticed among the Indians of that region pipes and ornaments made of copper. "They had red copper tobacco-pipes, and other things of copper they did wear about their necks." Robert Juet, who served under Hudson as mate in the Half-Moon, relates these details in the journal he has left behind.† Additional statements of similar purport might be cited from the early relations concerning the discovery of North America.

While Messrs. Squier and Davis were engaged, more than twenty years ago, in surveying the earthworks of the Mississippi valley, more especially those of the State of Ohio, they found in the sepulchral and so-called sacrificial mounds a number of copper objects, which they have described and figured in the work containing the results of their investigations.‡ They also met small pieces of the unwrought natural metal in some of the mounds. The copper specimens obtained during this survey were formerly in the possession of Dr. Davis, one of the explorers, and I had frequent occasion to examine them. At present they form a part of the Blackmore Museum, at Salisbury, England, to which institute Dr. Davis sold his valuable collection. They are either implements, such as axes, chisels, and gravers; or bracelets, beads, and other probably ornamental objects, exhibiting quite peculiar forms, which were, perhaps, owing to the singular methods employed in fashioning the copper into definite shapes. The axes resemble the flat celts of the European bronze period, and doubtless were fastened in handles like the latter. Some of the bracelets of the better class are of very good workmanship, the simple rods which form them being well rounded and smoothed, and bent into a regular circle until their ends meet. I have seen quite similar bronze bracelets in European collections. The objects just described obviously have been fashioned by hammering; others, however, consisting of hammered copper sheet, received their final shape by *pressure*. To these belong certain circular concavo-convex discs, from one and one-

* Narratives of the Career of Hernando de Soto in the Conquest of Florida, as told by a Knight of Elvas, and in a Relation by Luys Hernandez de Biedma, Factor of the Expedition. Translated by Buckingham Smith. New York, 1866, p. 72.

† Journal of the Voyage of the Half-Moon, in Collections of the New York Historical Society, Second Series, Vol. I, 1841, p. 323.

‡ Ancient Monuments of the Mississippi Valley, pp. 196–207.

half inches to two inches in diameter, which have been likened to the bosses observed on harnesses. Concerning their use, nothing is definitely known, but it is presumed that they were destined for purposes of ornament. The manipulation of pressure was likewise employed in making smaller articles of decoration resembling the convex metal buttons still seen on the clothes of the peasantry of Germany and other European countries. However, in minutely describing these remarkable products of aboriginal art, I would merely repeat what already has been stated, detailed accounts being given in the well-known work of Messrs. Squier and Davis.

Although the fire on the hearths or altars now inclosed by the sacrificial mounds* was sometimes sufficiently strong to melt the deposited copper articles, it does seem that this proceeding induced the ancient inhabitants to avail themselves of fire in working copper; they persisted in the tedious practice of hammering. Yet one copper axe, evidently *cast*, and resembling those taken from the mounds of Ohio, has been ploughed up near Auburn, in Cayuga County, in the State of New York.† This specimen, which bears no traces of use, may date from the earlier times of European colonization. It certainly would be wrong to place much stress on such an isolated case. The Indians, moreover, learned very soon from the whites the art of casting metals. For this we have the authority of Roger Williams, who makes the following statement in reference to the New England Indians; "*They have an excellent Art to cast our Pewter and Brasse into very neate and artificiall Pipes.*"‡

In the Lake Superior district, resorted to by the aboriginal miners, there have been found, besides many grooved stone hammers (sometimes of very large size) and rude wooden tools, various copper implements, such as chisels, gads, &c., and some spear-heads in which, in lieu of a socket, the flat sides at the lower end are partly bent over,§ a feature also peculiar to certain European bronze celts, which, on this account, are denominated "winged" celts.

The copper-lands of Northern Michigan, it has been stated, were visited by the aborigines for the sake of obtaining copper at a period anteceding the arrival of the whites. It is probable that small bands of various northern tribes made periodical excursions to that locality, returning to their homes when they had supplied themselves with sufficient quantities of the much-desired metal. The indications of permanent settlements, namely, burial-places, defensive works, traces of cultivation and

* For a precise description of the remarkable stratified mounds denominated "sacrificial," I must refer to the "Ancient Monuments of the Mississippi Valley." Burned human bones being often discovered in them in connection with manufactured objects, Sir John Lubbock suggests that these mounds are of a sepulchral rather than a sacrificial character. (Prehistoric Times, first ed., p. 219, &c.)

† Squier, Aboriginal Monuments of the State of New York, Washington, 1849, p. 78.

‡ Roger Williams, A Key into the Language of America; Providence, 1827, p. 55. (Reprint of the London edition of 1643.)

§ Whittlesey, Ancient Mining, &c.

dwellings, &c., are wanting, and the small number of chaseable animals, indeed, offered but little inducement to a protracted sojourn. The question, at what time the natives ceased to resort to the mines, has been answered in various ways. Mr. Whittlesey is of opinion that from five to six hundred years may have elapsed since that time, basing his argument on the growth of trees that have sprung up in the rubbish thrown out from the mines; Mr. Lapham, on the other hand, believes in a continuance of the aboriginal mining operations to more recent periods, and thinks they were carried on by the progenitors of the Indians still inhabiting the neighboring parts, although they possess no traditions relative to such labors. Probably as early as the first half of the seventeenth century the French of Canada entertained with those tribes a trade that provided the latter with iron tools, and the ornaments and trinkets so much coveted by the red race. Thus, the inducements to obtain copper ceased, and the practice of procuring it being once discontinued, a few centuries may have sufficed to efface the tradition from the memory of the succeeding generations. Yet, like many other points of North American archæology, this matter is still involved in obscurity, and it would be hazardous, at present, to pronounce any decided opinion on the subject.*

The occurrence of native copper in the United States is not confined to the shore of Lake Superior. As I am informed by Professor James D. Dana, it is also met, in pieces of several pounds' weight, in the valley of the Connecticut river, and likewise, in smaller pieces, in the State of New Jersey, probably originating in both cases from the red sandstone formation. Near New Haven, Connecticut, a mass was found weighing ninety pounds. Such copper finds may have furnished a small part of the metal worked by the aboriginal inhabitants; its real source, however, must be sought, in all probability, in the mining district of Lake Superior. It is a remarkable circumstance that the native copper there occurring sometimes incloses small masses of native silver, a juxtaposition which, as I believe, is not to be observed at any other place in the United States; and just such pieces in which the two natural metals are combined have been taken from a few of the tumuli of Ohio.

Though copper articles of Indian origin are comparatively scarce in

*The Indians certainly are a forgetful race. The traveler Stephens, who has examined and described the grand ruins of ancient buildings in Yucatan and the neighboring states, maintains—and I believe on good grounds—that these erections, at least in part, are the work of the same Indian populations with whom the conquistadores (Hernandez de Córdova, Grijalva, Cortés) were brought into contact during the sixteenth century. The present descendants of the builders of those magnificent works have preserved no recollections of their more advanced ancestors. Whenever Stephens asked them concerning the origin of the buildings, their answer was, they had been erected by the *antiguos;* but they could not explain their destination; they were unacquainted with the meaning of the statues and fresco paintings, and manifested in general a total ignorance of all that related to their former history.

the United States,* the field of their distribution, nevertheless, is very wide, extending from the Great Lakes to the Gulf States, and from the Atlantic coast to the Mississippi, and, perhaps, some distance beyond that river. Taking it for granted, as we may do, that the northern part of Michigan is the point from which the metal was spread over that area, the traffic in copper presents itself as very extensive as far as distance is concerned. The difficulties connected with the labor of obtaining this metal doubtless rendered it a valuable object, perhaps no less esteemed than bronze in Europe, when the introduction of that composition was yet of recent date. The copper probably was bartered in the shape of raw material. Small pieces of this description, I have already stated, were taken from the mounds of Ohio, and larger masses occasionally have been met in the neighborhood of these works. One mass weighing twenty-three pounds, from which smaller portions evidently had been detached, was discovered in the Scioto valley, near Chillicothe, Ohio.† Of course, it is impossible at present to demonstrate in what manner the copper trade was carried on, and we have to rest satisfied with the presumption that the raw or worked copper went from hand to hand in exchange for other productions of nature or art, until it reached the places where we now find it. Perhaps there were certain persons who made it their business to trade in copper. I must not omit to refer here to some passages bearing, though indirectly, on the latter question, which are contained in the old accounts of Hernando de Soto's expedition. Garcilasso de la Vega speaks of wandering Indian merchants (*marchands*), who traded in salt.‡ The Knight of Elvas is still more explicit on this point. According to him, the Indians of the province of Cayas obtained salt by the evaporation of saline water. The method is accurately described. They exported salt into other provinces, and took in return skins and other commodities. Biedma, who accompanied that memorable expedition as accountant, likewise speaks in various places of salt-making among the Indians.§

GALENA.

It has been a common experience of discoverers that the primitive peoples with whom they came in contact manifested, like children, a remarkable predilection for brightly-colored and brilliant objects, which, without serving for any definite purpose, were valued merely on account of their external qualities. The later North American Indians exhibited

* The Smithsonian Institution has been receiving for years Indian antiquities from all parts of North America, yet possessed in 1870 only seven copper objects; namely, three spearheads, two small rods, a semilunar knife with convex cutting edge, and an axe of good shape. Professor Baird was kind enough to send me photographs and descriptions of these articles.

† Ancient Monuments, &c., p. 203.

‡ Conquête de la Floride, Leide, 1731, Vol. II, p. 400.

§ Narratives of the Career of Hernando de Soto, &c., p. 124. Biedma, pp. 152, 153, and 257.

this tendency in a marked degree, and their predecessors, whose history is shrouded in darkness, seem to have been moved by similar impulses. Thus the common ore of lead, or galena, was much prized by the former inhabitants of North America, though there is, thus far, no conclusive evidence of their having understood how to render it serviceable by melting. Quite considerable quantities of this shining mineral have been met in the mounds of Ohio. On the hearth of one of the sacrificial mounds of that State, Messrs. Squier and Davis discovered a deposit of galena, in pieces weighing from two ounces to three pounds, the whole quantity amounting perhaps to thirty pounds. The sacrificial fire had not been strong enough to convert the ore into pure metal, though some of the pieces showed the beginning of fusion.* As stated before, there is no definite proof that the aborigines were acquainted with the process of reducing lead from its ore; for as yet no leaden implements or ornaments have been discovered that can be ascribed with certainty to the former population. The peculiarly shaped object of pure lead figured on page 209 of the "Ancient Monuments," which came to light while a well was sunk within the ditch of the earthwork at Circleville, Ohio, was perhaps made by whites, or by Indians at a period when they already had acquired from the former the knowledge of casting lead. This curious relic is in possession of Dr. Davis, and I have often examined it. The archæological collection of the Smithsonian Institute contains not a single Indian article of lead, but quantities of galena, which were taken from various mounds. Yet, supposing the Indians had known the fusibility of galena, the lead extracted therefrom could not have afforded them great advantages, considering that its very nature hardly admitted of any useful application. "Too soft for axes or knives, too fusible for vessels, and too soon tarnished to be valuable for ornament, there was little inducement for its manufacture."—(Squier and Davis.) However, in making net-sinkers, it would have been preferable to the flat pebbles notched on two opposite sides, which the natives used as weights for their nets. Pebbles of this description abound in the valley of the Susquehanna and in various other places of the United States, especially in the neighborhood of rivers.

The frequent occurrence of galena on the altars of the sacrificial mounds proves, at any rate, that the ancient inhabitants attributed a peculiar value to it, deeming it worthy to be offered as a sacrificial gift. The pieces of galena found in Ohio were, in all probability, obtained in Illinois or Missouri, from which regions they were transferred by way of barter, as we may presume, to the Ohio valley. No original deposits of galena are known in greater proximity that could have furnished pieces equal to those taken from the mounds of Ohio.

*Ancient Monuments, pp. 149 and 209.

OBSIDIAN.

The peculiar glass-like stone of volcanic origin, called obsidian, which played such an important part in the household of the ancient Mexicans, has not been met *in situ* within that large portion of the United States (probably of North America in general) that lies north of Mexico and to the east of the Rocky Mountains. Messrs. Squier and Davis, nevertheless, have found obsidian in the shape of points for arrows and spears and cutting implements, though mostly broken, in five mounds of the Scioto valley, in Ohio; an object made of this material was likewise found in Tennessee,* and the numerous unopened mounds of the United States may inclose many more articles of this class. The copper used by the Indians, it has been seen, occurs as a product of nature within the area over which it was spread by human agency; it is different, however, with regard to obsidian, and the question therefore arises, from what region the builders of the large inclosures and tumuli in Ohio obtained the last-named mineral. Obsidian, we know, is found in the present territory of the United States on the western side of the Rocky Mountains. Captain Bonneville noticed, about forty years ago, that the Shoshonees or Snake Indians in the neighborhood of Snake river (or Lewis river) used arrows armed with points of obsidian, which, he adds, abounds in that vicinity.† The latter fact is confirmed by Samuel Parker, who found, some years later (1835), in the volcanic formations of that region, "many large and fine specimens of pure obsidian or volcanic glass."‡ According to Wyeth, the Shoshonees also employ sharp obsidian flakes of convenient shape as knives, which they sometimes provide with handles of wood or horn. The same author mentions the frequent occurrence of obsidian in the district inhabited by the Shoshonees.§ It is known that various tribes in New Mexico, Arizona, and neighboring parts, Apaches, Mojaves, and others, frequently employ obsidian in the manufacture of their arrowheads.

Mr. John R. Bartlett, from 1850 to 1853 commissioner of the United States for determining the boundary line between the latter and Mexico, found pieces of obsidian and fragments of painted pottery along the Gila river, wherever there had been any Indian villages; and also among the ruins of the *Casas grandes*, in Chihuahua, as well as those of the Gila and Salinas rivers.‖ The same observation has been made by earlier and later travelers. The natives of Upper California employ obsidian extensively for making arrowheads. Mr. Caleb Lyon, who

* Troost, Ancient Remains in Tennessee, in: Transactions of the American Ethnological Society, New York, 1845, Vol. I, p. 361.

† Irving, Adventures of Captain Bonneville, New York, 1851, p. 255.

‡ Parker, Exploring Tour beyond the Rocky Mountains, Ithaca, New York, 1844, p. 98.

§ Wyeth, in Schoocraft's Indian Tribes, Vol. I, p. 213.

‖ Bartlett, Personal Narrative, &c., New York, 1854, Vol. II, p. 50. Compare: Humboldt, Essai politique sur la Nouvelle-Espagne, Paris, 1825, Vol. II, p. 243, and Clavigero, History of Mexico, Philadelphia, 1817, Vol. I, p. 151.

was, about ten years ago, among the Shasta Indians in California, saw one of the tribe engaged in making arrowheads from obsidian as well as from the glass of a broken porter-bottle. He describes the method of manufacture in a letter which was published by the American Ethnological Society.* To this letter I shall refer in a succeeding section of this essay, when treating of the division of labor among the North American Indians. Mr. Bartlett visited, while in California, a locality in the Napa valley (north of San Francisco), where obsidian occurs in pieces from the size of a pea to that of an ostrich egg, which are imbedded in a mass resembling a coarse mortar of lime, sand, and gravel. He found the surface in many places covered, from six to twelve inches in depth, with broken pieces and small boulders of this volcanic substance. The appearance of these spots reminded him of a newly-made macadamized road.†

The most extensive use of obsidian, however, was formerly made in Mexico, before the empire of the Aztecs succumbed to the Spanish invaders. Old obsidian mines are still seen on the *Cerro de Navajas*, or "Hill of Knives," which is situated in a northeasterly direction from the city of Mexico, at some distance from the Indian town Atotonilco el Grande. These mines provided the ancient population of Mexico with vast quantities of the much-prized stone, of which they made those fine double-edged knives, arrow and spear-heads, mirrors, very skilfully executed masks, and ornaments of various kinds. Humboldt speaks of the Hill of Knives in a transient manner;‡ for a precise description we are indebted to the meritorious English ethnologist, E. B. Tylor, who visited that interesting locality in 1856, while traveling through Mexico in company with the late Mr. Christy.§ In describing the mines, Mr. Tylor says: "Some of the trachytic porphyry which forms the substance of the hills had happened to have cooled, under suitable conditions, from the molten state into a sort of slag, or volcanic glass, which is the obsidian in question; and, in places, this vitreous lava, from one layer having flowed over another which was already cool, was regularly stratified. The mines were mere wells, not very deep, with horizontal workings into the obsidian where it was very good and in thick layers. Round about were heaps of fragments, hundreds of tons of them; and it was clear, from the shape of these, that some of the manufacturing was done on the spot. There had been great numbers of pits worked, and it was from these *minillas*, little mines, as they are called, that we first got an idea how important an element this obsidian was in the old Aztec civilization. In excursions made since, we traveled over whole districts in the plains where fragments of these arrows and knives were to be found

* Bulletin of the American Ethnological Society, New York, 1861, Vol. I, p. 39.

† Personal Narrative, Vol. II, p. 49.

‡ Essai politique sur la Nouvelle-Espagne, Vol. III, p. 122.

§ Tylor, Anahuac: or Mexico and the Mexicans, Ancient and Modern, Lond., 1861. This volume contains, besides many facts relating to the archæology and ethnology of Mexico, the best observations on obsidian I have found in any work on that country.

literally at every step, mixed with morsels of pottery, and here and there a little clay idol."*

From the centre of the State of Ohio to the country of the Shoshonees, as well as to the Rio Gila, and the just-described mines in Mexico, the straight distances are almost equal, measuring about seventeen hundred English miles; indeed, the Mexican mines are a trifle nearer to Ohio than the above-mentioned districts. It would be lost labor, therefore, to indulge in speculations from which of these localities the obsidian found in Ohio and Tennessee was derived. The number of articles of this stone that has been met east of the Mississippi is so exceedingly small that its technical significance hardly deserves any consideration. Yet, the sole fact of finding worked obsidian at such great distances from the nearest places where it occurs either *in*

* Anahuac, p. 99. The following interesting communication was addressed to me by Dr. C. H. Berendt:

"During one of many excursions which I made in the years 1853-'56 around the Citlaltepetl, or Pico de Orizaba (in the State of Vera Cruz), I saw an obsidian mine on the eastern slope of that mountain. I had heard of it from my friend the late Mr. C. Sartorius, who had visited the place years ago. I was informed that the Indians of the village of Alpatlahua knew the place, but that they did not like to have it visited. Some say they have treasures hidden in the caves of the neighborhood; while others believe that they have idols in those lonely places which they still secretly worship. The cura of San Juan Coscomatepec, who was of this latter opinion, gave me the name of a mestizo farmer in the neighborhood who might be induced to show me the place. Our party followed from Coscomatepec the road which leads to the rancho Jacal and the pass of La Cuchilla. We did not find the mestizo at home, but his wife, who directed her boy to show us the cave. Reaching the bridge of the Jamapa river, we took a by-road parting to the north, which brought us to the village of Alpatlahua, and about four miles farther north to a branch of the Jamapa river, which we crossed. We then left the road and proceeded about half a mile up the river through thick woods, when we found ourselves suddenly before the entrance of the cave. It was about fifty feet high and of considerable width, but obstructed by fallen rocks and shrubs. Heaps of obsidian chips of more than a man's height filled the bottom of the grotto, which had apparently no considerable horizontal depth. To the left the mine was seen, an excavation of from six to eight square yards, the bottom filled up with rubbish and chips. Obsidian, evidently, had not only been quarried, but also been made into implements at this spot, the latter fact being proved by the occurrence of cores, or nuclei, of all sizes, from which flakes or knives had been detached. We were not prepared for digging, and it was too late for undertaking explorations that day. So we left, with the purpose to return better prepared at another time, hoping to find some relics of the miners and workmen, and, perhaps, other antiquities. But it happened that I never had an opportunity to visit the place again. Mr. Sartorius saw in this cave three entrances walled up with stone and mortar, but these I did not discover, having, as stated, no time for a careful examination. Future travelers, I hope, will be more successful.

"Mr. Sartorius mentioned another place, likewise in the State of Vera Cruz, where obsidian formerly was quarried. This place is situated in the chain of mountains extending from the Pico de Orizaba to the Cofre de Perote. One of the intervening mountains, called Xalistac, is distinguished by a white spot that can be seen at the distance of many miles, even at Vera Cruz. It is produced by an outcropping of pumice-stone resting on an immense mass of obsidian that has been worked in various places. I know the mountain well, but not the road leading to it, never having traveled in that direction."

situ or in consequence of human agency (as, perhaps, on the Gila), is in itself of importance, for it furnishes an additional illustration of the far-reaching communications among the aborigines of North America.

MICA.

Like the shining galena, mica (commonly called isin-glass), was a substance held in high estimation by the former inhabitants; but, while the first-named mineral apparently fulfilled no definite purpose, being deemed valuable merely for its brilliancy, the latter was often made into articles of ornament, a purpose for which it certainly was well fitted on account of its metallic lustre. It is also said to have been used for mirrors. Mica is found in the tumuli in considerable quantities, sometimes in bushels, and is often ploughed up in the neighborhood of old earthworks. It occurs in sepulchral mounds as well as, though more rarely, in those of supposed sacrificial character. In the former the plates of mica are placed on the chest or above the head of the skeleton, and sometimes they cover it almost entirely. If I speak here of "plates of mica," the expression is to be taken literally, it being known that this mineral occurs in some of the eastern parts of North America in masses of considerable size, as, for instance, in New Hampshire, where pieces of from two to three feet in diameter have been observed.

The most important archæological finds of mica, as far as I know, occurred in Ohio. Of some of them I will give here a brief account.

Mr. Atwater has left a very accurate description of the earthwork at Circleville, Ohio, now mostly obliterated, which consisted of a large circular and adjoining quadratic embankment. In the centre of the circle there arose a sepulchral mound which contained two skeletons and various objects of art, among which was a "mirror" of mica, about three feet long, one foot and a half wide, and one inch and a half in thickness. Atwater found these so-called mirrors at least in fifty different places in Ohio, mostly in mounds. "They were common among that people," he says, "and answered very well the purpose for which they were intended. These mirrors were very thick, otherwise they would not have reflected the light."* It has been doubted, however, whether the objects served as mirrors. It is true, every one who has come in contact with the modern Indians knows how eager they are, prompted by vanity, to obtain from the traders small looking-glasses, which they often carry about their persons in order to contemplate their features, or to have them on hand when they are about to paint their faces, or to eradicate their scanty growth of beard. Yet, after all, I am inclined to believe that Atwater's so-called mirrors were nothing else but those large plates of mica, probably of symbolic character (as will be seen), which have frequently been met since the publication of his account.

In the year 1828, during the digging of a canal near Newark, Ohio, one of the low mounds frequent in that neighborhood was removed. It

* Atwater, in: Archæologia Americana, Worcester, 1820, Vol. I, pp. 178, 225.

contained fourteen skeletons in a high state of decomposition, which were covered with a regular layer of mica plates. The latter were from eight to ten inches in length, four or five inches wide, and from half an inch to an inch in thickness. The quantity of mica thrown up from this mound amounted to *fifteen or twenty bushels.**

During their archæological investigations, Messrs. Squier and Davis frequently found mica in the mounds, and they have given precise accounts of their discoveries. In one of the sacrificial mounds near Chillicothe, Ohio, they came upon a layer of round plates of silvery mica, measuring from ten to twelve inches in diameter, which overlapped each other like the tiles or slates on a roof, and were deposited in the shape of a half-moon. The excavation laid bare more than one-half of this crescent, which could not have measured less than twenty feet from horn to horn. The greatest width (in the middle) was five feet. It has been thought that the shape of this curious deposit of mica might be suggestive of the religious views of the builders of the mound, and imply a tendency to moon-worship.† Another mound not far from the preceding one—both belonged to a group of twenty-three within an inclosure—likewise contained mica.‡ The circular cavity of the altar in this mound was filled with fine ashes intermixed with fragments of clay vessels and some small convex copper discs. Over these contents of the basin a layer of mica sheets, overlapping each other, was spread like a cover, which, again, served as the basis for a heap of burned human bones, probably belonging to a single person.§

The authors of the "Ancient Monuments" also found occasionally in the mounds ornaments made of thin sheets of mica, cut out very neatly and with great regularity in the shapes of scrolls, oval plates, and discs, and pierced with small holes for suspension or attachment. They doubtless were intended to embellish the dress of persons of distinction.‖ Dr. Davis has some of these ornaments which, fastened on black velvet, almost might be taken for silver objects, the mica of which they are made being of the perfectly opaque kind. Ornamental plates of mica, further, were met in the large Grave-Creek Mound, situated twelve miles below Wheeling, in Western Virginia. This burial-mound, which is one of the highest in the United States—it is seventy feet high—was opened in 1838. Near one of the skeletons, one hundred and fifty rather irregularly-shaped thin sheets of mica, from one inch and a half to two inches in size, were collected. They were all provided with two or more holes for stringing them together, and had evidently formed a scarf or some other article of personal adornment.¶

* Ancient Monuments, p. 72.

† Ancient Monuments, p. 154.

‡ This earthwork, called "Mound City" by Squier and Davis, will be described in a subsequent section.

§ Ancient Monuments, p. 145.

‖ Ancient Monuments, p. 155; representations on p. 240.

¶ Schoolcraft, in: Transactions of the American Ethnological Society, Vol. I, p. 399.

The preceding quotations, to which others of similar purport might be added, will suffice to show how much mica was valued by the former inhabitants of the Mississippi valley; indeed, the frequent and peculiar occurrence of this mineral in the mounds almost might justify the conjecture that it was believed to be invested with some mysterious significance, and played a part in the superstitious rites of the aborigines. Mica has been found in a worked and raw state in districts where it is not furnished by nature, and therefore may be safely classed among the aboriginal articles of exchange. In the State of Ohio, to which my observations chiefly refer, mica is not found *in situ*, and it is presumed that the mineral discovered in that State was derived from the southern spurs of the Alleghany Mountains. Yet, it may have been brought from greater distances, and from various points, to its present places of occurrence.

SLATE.

Various kinds of ancient Indian stone manufactures frequently consist of a greenish slate, which is often marked with darker parallel or concentric stripes or bands, giving the objects made of it a very pretty appearance. This slate is not very hard, but of close grain and therefore easily worked and polished. The objects made of this stone, which occur on the surface as well as in mounds, are generally executed with great care and regularity, and it is much to be regretted that the destination of some of them is not quite well known. Among the latter are certain straight tubes of cylindrical and other shapes and various lengths, which sometimes terminate in a kind of "mouth-piece." While the smaller ones, which often measure only a few inches, have been thought to represent articles of ornament, or amulets, a different purpose has been ascribed to the longer specimens. Schoolcraft appears to consider these latter as telescopic instruments which the ancient inhabitants used for observing the stars. This view, I think, has been generally rejected. It is far more probable that these tubes, in part at least, were implements of the sorcerers or medicine-men, who employed them in their pretended cures of diseases. They applied one end of the tube to the suffering part of the patient and sucked at the other end, in order to draw out, as it were, the morbid matter, which they afterwards feigned to eject with many gesticulations and contortions of the body. Coreal calls the tubes used by the medicine-men of the Florida Indians a kind of shepherd's flute (*une espèce de chalumeau*) and the character of some of the stone implements in question that have been found certainly justifies this comparison.* Kohl saw, as late as 1855, one of the above-mentioned cures performed among the Ojibways of Lake Supe-

* Coreal, Voyages aux Indes Occidentales, Amsterdam, 1722, Vol. I, p. 39.

rior; in this instance, however, the tube used by the medicine-man was a smooth hollow bone, probably of the brant-goose.*

A far more numerous class of articles often made of the greenish striped slate is represented by small, variously-shaped tablets of great regularity and finish, which are pierced in the middle with one, two, or more round holes. The most frequent shape of these tablets is illustrated by the upper figure on Plate 28 in Vol. I of Schoolcraft's work on the Indian tribes. It is that of a rectangle with sides exhibiting a slight outward curve. The full-size drawing of this rather large specimen is done in colors, and thus affords the advantage of showing the greenish tint and the markings of the stone. Other tablets are lozenge-shaped, quadratic with inwardly-curved sides, oval, cruciform, &c.† Most of them have two perforations, though specimens with only one are not scarce, while those that have more than two holes are of less frequent occurrence. The holes are drilled either from one side or from both, and, accordingly, of conical or bi-conical shape. They seldom have more than one-eighth of an inch in diameter at the narrowest part. Concerning the destination of the tablets nothing is definitely known. At first sight one might be inclined to consider them as objects of ornament or as badges of distinction; but this view is not corroborated by the appearance of the perforations, which exhibit no traces of the wear produced by continued suspension, being, on the contrary, in most cases as perfect as if they had but lately been drilled. The classification of the tablets as "gorgets," therefore, may be regarded as erroneous. Schoolcraft calls them implements for twine-making. It has been suggested that they were used in condensing and rounding bow-strings by drawing the wet strips of hide, or the sinews employed for that purpose, through the round perforations. The diameter of the latter, it is true, corresponds to the thickness of an ordinary Indian bow-string; but also in this case the usually unworn state of the holes rather speaks against this supposition.

Being desirous to learn whether Mr. George Catlin had seen, during his first sojourn among the western tribes, anything like those tablets used by them in making bow-strings, I availed myself of that gentleman's return to the United States, and asked him by letter, among other matters, for information concerning this subject. He replied (December 24, 1871) as follows:

"Of the tablets you speak of, I have seen several, but the holes were much larger than those you describe. Those that I have seen were

* Kohl, Kitschi-Gami, oder Erzählungen vom Obern See, Bremen, 1856, Vol. I, p. 148. Compare: Venegas, History of California, London, 1759, Vol. I, p. 97, and Baegert's Account of the Aboriginal Inhabitants of the Californian Peninsula, Smithsonian Report for 1864, p. 386. Drawings of the stone tubes are given on pp. 224–27 of the "Ancient Monuments of the Mississippi Valley."

† The various shapes of these tablets, and of other perforated objects, not exactly tablets, but probably intended for the same purpose, are represented on pages 236 and 237 of the "Ancient Monuments."

used by the Indians for grooving the shafts of their arrows. All arrows of the primitive Indians are found with three grooves from the arrow's shoulder, at the fluke, extending to, and conducting the air between, the feathers, to give them steadiness. These grooves, on close examination, are found to be indented by pressure, and not in any way cut out; and this pressure is produced, while forcing the arrow, softened by steam, through a hole in the tablet, with the incisor of a bear set firmly in a handle and projecting over the rim of the hole as the arrow-shaft is forced downward through the tablet, getting compactness, and on the surface and in the groove a smoothness, which no cutting, filing, or scraping can produce. It would be useless to pass the bow-string through the tablet, for the evenness and the hardness of the strings are produced much more easily and effectually by rolling them, as they do, between two flat stones while saturated with heated glue."

Thus, Mr. Catlin's experience is rather unfavorable to the supposition that the pierced stone tablets mentioned by me were used in condensing bow-strings. Yet, after all, they probably served for some similar purpose, which may be clearly defined hereafter by continued examination and comparison. I regard them as implements, and not as objects of ornament or distinction.*

The greenish slate is frequently the material of another numerous class of Indian relics of enigmatical character. I allude to those curious articles bearing a distant resemblance to a bird, which are pierced at the base with diagonal holes, evidently for suspension, the traces of wear being distinctly visible. They probably represent insignia or amulets. I have also heard the suggestion that they were used for removing the husk of Indian corn.†

Of much rarer occurrence than the articles thus far enumerated in this section are perforated implements somewhat resembling an axe with two cutting edges, or, more often, a double pick-axe, which, doubtless, were provided with handles and worn as badges of distinction by the superiors.‡ These objects are for the most part elegantly shaped, but of small size, and cannot have been applied to any practical use, their material, moreover, consisting generally of soft stone, more particularly of the greenish slate in question. It is evident, therefore, that they fulfilled a symbolical purpose, and were employed in the manner just mentioned.

---

* The Smithsonian Report for 1870, which has appeared since the above was written, contains, among other ethnological matter, an account of an exploration of mounds in Kentucky, by Mr. Sidney S. Lyon. Among the contents of one of the mounds was "a black stone with holes through it." *I have seen this kind of an instrument*, says Mr. Lyon, *used by the Pah-Utes of Southeastern Nevada, for giving uniform size to their bow-strings.* (p. 404.)

† A group of these singular objects is represented on page 239 of the "Ancient Monuments."

‡ Schoolcraft gives on Plate 11, Vol. I, of his large work, two colored half-size representations of such implements, which he calls "maces."

Having now briefly described the most important classes of relics made of the striped slate, I pass over to the principal point of inquiry, namely, the extent of their occurrence. I know from personal experience that they are found from the Atlantic coast to the Mississippi river, a distance about equal to one-third of the whole breadth of the United States. It is possible that they are scattered over a far greater area. In 1848, when Squier and Davis published their work, in which aboriginal manufactures were for the first time accurately described, they could not specify the locality from which the oft-mentioned slate was derived. Since that time geological surveys have been made in all States of the Union, and the places of its occurrence are no longer unknown. It appears, I am informed, as the oldest sedimentary formation, in quite considerable masses along the Atlantic coast, and has been observed from Rhode Island to Canada. This slate is not believed to occur in other parts of the Union, and it may be presumed, therefore, that it was brought from the Atlantic coast-districts, either in a rough or already worked condition, to the more western regions of the United States.

FLINT.

The real flint (*Feuerstein* in German) which is found abundantly, in rounded pieces or nodules in the cretaceous formations of the countries bordering on the Baltic, of England, France, &c., and which has played such an important part in the prehistoric ages of Europe, does not seem to occur within the United States. For this information I am personally indebted to Professor James D. Dana. On the other hand, many parts of this country are very rich in various kinds of stones of a silicious character, which, in consequence of their hardness and conchoidal fracture, were well fitted to replace the missing variety in the production of chipped implements. The term "flint," therefore, is used here in a rather extensive sense, comprising hornstone, jasper, chalcedony, ferruginous quartz, sweetwater quartz, milky quartz, semi-opalic stones, &c., and the numerous transitions from one quartzy variety into another, for which the science of mineralogy has no special denominations. The common white quartz, also, I may remark in this place, and the transparent rock-crystal, were used for pointing arrows; and in districts where harder stones were scarce, even slates and greenstones served as substitutes for them in the fabrication of arrow and spearheads.

As in Europe, so also in the United States, places have been discovered where the manufacture of flint implements was carried on. These "open-air workshops" (*ateliers en plein air*) are by no means rare in North America, and they begin to attract considerable attention since the successful archæological researches in Europe have stimulated to similar pursuits in this country. As the North American tribes all used the bow, and consequently were in constant need of arrowheads, the manufacture of the latter took place in many localities, especially in such as furnished the stones most proper for that purpose. The *Kjoek-*

kenmoedding at Keyport, New Jersey, described by me in the Smithsonian Report for 1864, evidently was one of the places where flint implements were made by the natives. I not only saw there among the shell-heaps countless chips of flint, but found also a number of unfinished arrowheads, which had been thrown aside on account of a wrong crack or some other defect in the stone. The necessary material was here furnished on the spot, in the shape of innumerable water-worn pebbles of silicious character, which lie intermixed with the shells. Among the unfinished arrowheads picked up by me at this place there are some which exhibit a part of the smooth water-worn surface of the pebble from which they were made.

In the middle part of the Mississippi valley, where I lived many years, and had occasion to make various observations, the Indians were amply provided by nature with the material employed in the fabrication of spear and arrowheads. The prevailing rock of those regions is a limestone in which several of the varieties of the quartz family are found, either in layers or in irregular concretions. In the bluff formations of the "American Bottom" in Illinois, for instance, I have traced myself layers of hornstone, chalcedony, &c., for the distance of miles. In the districts under notice, moreover, the surface is covered here and there with many silicious pebbles and boulders, which furnished an inexhaustible supply of available material.

An important locality to which the aborigines resorted, perhaps from great distances, for quarrying flint, is in Ohio, on the line of a calcareo-silicious deposit, called "Flint Ridge," which extends through Muskingum and Licking Counties of that State. "The compact silicious material of which this ridge is made up," says Dr. Hildreth, "seems to have attracted the notice of the aborigines, who have manufactured it largely into arrow and spearheads, if we may be allowed to judge from the numerous circular excavations which have been made in mining the rock, and the piles of chipped quartz lying on the surface. How extensively it has been worked for these purposes, may be imagined from the countless number of the pits, experience having taught them that the rock recently dug from the earth could be split with more freedom than that which had lain exposed to the weather. These excavations are found the whole length of the outcrop, but more abundantly at 'Flint Ridge,' where it is most compact and diversified with rich colors."*

The Indian working-places of which I spoke are not always met in the neighborhood of those spots where flint was quarried or otherwise abundant, but also sometimes at considerable distances from the latter, in which cases they are, of course, of comparatively small extent. Their existence, however, proves that the material was transported from place to place, and thus assumed the character of a ware. Colonel

* Hildreth, in Mather's First Annual Report on the Geological Survey of the State of Ohio, Columbus, 1838, p. 31.

Charles C. Jones, of Brooklyn, who has paid particular attention to the former history of his native State Georgia, informed me he had observed quantities of silicious stone, surrounded by numerous rejected fragments and unfinished spear and arrowheads of the same material, in districts of that State where far and near no quartz minerals occur *in situ*. He showed me a number of these incomplete flint objects obtained from such places.

For the fact that stones for arrowheads formed an object of traffic among the natives, even historical evidence is not wanting. I refer to a passage in the relation of Cabeça de Vaca, the first European who has given an account of the interior of North America. The passage in question will be quoted in a subsequent section.

I am of opinion that flint in a half-worked state, that is, in flattish pieces roughly chipped around their circumference and presenting irregular heart-shaped, oval, or round outlines, formed an object of exchange, and as such was transported to places far distant from the sites which furnished the raw material. Those who quarried the flint fashioned it in this manner for the sake of saving space and for easier transportation. Smaller or greater quantities of such worked flint fragments of homogeneous character are sometimes found in the earth, where the natives had buried them, believing that flint splits more readily when recently taken from the ground. These deposits, however, are not always composed of pieces which required further chipping in order to receive their final shape, but also sometimes of finished implements. I have treated of these buried deposits of flint objects in an article published in the Smithsonian Report for 1868, to which I refer in order to avoid repetitions.* The agricultural implements of East St. Louis, described in that article, are very skilfully executed manufactures of the aborigines; the large flint discs, on the contrary, which, as I mentioned, Messrs. Squier and Davis found in great number in a mound of "Clark's Work" in Ohio, and the rude flint objects of elongated oval outline from the bank of the Mississippi between St. Louis and Carondelet, present, in all probability, only rudimentary forms of implements, and were destined to be finished at a future time. It cannot be doubted that the stone of which the discs of Clark's Work are made was derived from the quarries of Flint Ridge. This fact has been established by careful comparisons. The stone in question is designated as hornstone. It is a beautiful material, resembling in color and grain certain varieties of the real European flint, and is sometimes marked with darker or lighter concentric bands, the centre of which is formed by a small nucleus of blue chalcedony. These bands are particularly observable on the surfaces which have undergone a change of color by exposure. The stone, in general, possesses qualities by which it can be recognized at once, even when met in a wrought state far from its original place of occur-

* A Deposit of Agricultural Flint Implements in Southern Illinois, p. 401.

rence. According to Mr. Squier, arrowheads made of this hornstone have been found in Kentucky, Indiana, Illinois, and Michigan. That they occur in Illinois, I can attest from personal experience.

A very remarkable find of objects manufactured from the hornstone of Flint Ridge occurred in the summer of 1869 on the farm of Oliver H. Mullen, near Fayetteville, in St. Clair County, of the State of Illinois. Some children, amusing themselves near the barn of that farm, happened to dig into the ground, and came upon a deposit of fifty-two disc-like flint implements, which lay closely heaped together. I obtained a number of these implements through my indefatigable co-laborer, Dr. Patrick, of Belleville, Illinois. They coincide in shape with those of Clark's Work, but are somewhat smaller, and not, like the latter, superficially prepared objects, but highly-finished implements. This fact is shown by the careful chipping of the edges, to which sharpness and roundness have been imparted by small and carefully measured blows. Unlike the deposit of East St. Louis, which consisted of perfectly new implements, that of Fayetteville was made up of such as had already done service. To this conclusion I am lead by the character of their edges, which exhibit a slight wear or polish. I regard these implements as *scraping* or *smoothing tools*, to which purposes they were well adapted by their shape; and I have but little doubt that the less finished discs of Clark's Work were to be converted, by further chipping, into implements of the same kind.

In connection with the object, however, which I have in view in this essay, the identity of the stone of Flint Ridge with that of which the tools found at Fayetteville in Illinois consist, is the point that deserves particular consideration. This identity admits of no doubt. I was convinced of it at first sight when I received the implements from Fayetteville, and so were Messrs. Squier and Davis, to whom I showed my specimens. The direct distance from the quarries at Flint Ridge to Fayetteville is about four hundred English miles, and thus far, at least, the stone was exported, in a rudimentary or finished shape, from its original site. So much is certain; but it is not unlikely that implements made of this hornstone will be found hereafter at still greater distances from the quarries in Ohio.

RED PIPESTONE.

The celebrated red pipestone, that highly valued material employed by the Indians of past and present times in the manufacture of their calumets, occurs *in situ* on the Coteau des Prairies, an elevation extending between the Missouri and the headwaters of the Mississippi. This is the classical ground of the surrounding tribes, and many legends lend a romantic interest to that region. It was here that the Great Spirit assembled the various Indian nations and instructed them in the art of making pipes of peace, as related by Longfellow in his

charming "Song of Hiawatha." Even hostile tribes met here in peace, for this district was, by common consent, regarded as neutral ground, where strife and feuds were suspended, that all might resort unmolested to the quarry and supply themselves with the much-prized red stone. This material, though compact, is not hard, and therefore easily worked, and, moreover, capable of a high polish. It consists chiefly of silica and alumina, with an admixture of iron, which produces the red color. American, and probably also European, mineralogists call this stone Catlinite, in honor of the zealous ethnologist and painter, Catlin, who was the first to give an accurate account of its place of occurrence, and to relate the traditions connected with the red pipestone quarry.* This locality is the only one in North America where this peculiar stone is found, and it is doubtful, indeed, whether in any other place on both hemispheres a mineral substance is met which corresponds in every respect to the one in question.

The enterprising Jesuit missionary, Marquette, whose name is forever linked with the exploration of the Mississippi, smoked already in the year 1673 the pipe of peace with the Illinois Indians, and gives the following exact description of that important utensil, the bowl of which, it will be seen, consisted of the red stone of Coteau des Prairies. "It is made of a polished red stone, like marble, so pierced that one end serves to hold the tobacco, while the other is fastened on the stem, which is a stick two feet long, as thick as a common cane, and pierced in the middle; it is ornamented with the head and neck of different birds of beautiful plumage; they also add large feathers of red, green and other colors, with which it is all covered."† His ecclesiastical successors also frequently mention the red pipes in their writings, but none of them, as far as I know, alludes to the locality where the stone was obtained. The first notice referable to that place, I found in the "History of Louisiana" by DuPratz, and even his statement is totally erroneous as far as the situation of the quarry is concerned. "On the bank of the Missouri," he says, "there is to be seen a pretty high cliff (*écore*), which rises so abruptly from the water that the nimblest rat could not climb it. From the middle part of this cliff projects a mass of red stone, which is marked with white spots like porphyry, from which it differs, however, by inferior hardness, being almost as soft as tufa. It is covered by another kind of stone of no value, and rests upon the same sort of earth that forms the other hills. The inhabitants of the country, knowing the applicability of that stone, are in the habit of detaching pieces of it by arrow-shots, which pieces, falling into the water, are recovered by diving. From fragments of sufficient size they make calumets, using their knives and awls in manufacturing them. This stone can be

* Catlin, North American Indians, London, 1848, Vol II, Letters 54 and 55.

† Shea, Discovery and Exploration of the Mississippi Valley, New York, 1852, p. 35.

worked without difficulty and resists the fire very well."* Leaving aside the incorrect description of the locality and of the character of occurrence, the stone here mentioned corresponds exactly to that of Coteau des Prairies, the latter being, indeed, very often marked with lighter (though not white) spots, which give it a perfectly porphyritic appearance. I have seen many raw pieces of the red pipestone and have some myself, in which this peculiarity is prominently exhibited. The unworked stone is usually of a dull pale red, the heightened color appearing only after the process of polishing.

Carver, who explored the region of the Upper Mississippi in 1766–'68, mentions the red stone, but does not seem to have visited its place of occurrence, which he marks on his map as the "Country of Peace." He also states distinctly in his work that even individuals belonging to hostile tribes met in peace at the "Red Mountain," where they obtained the stone for their pipes.† This shows that, at his time, the neutrality of the district was still respected. This laudable regulation, it also appears, had not yet become obsolete in the beginning of the present century, for on the map accompanying the work in which Lewis and Clarke describe the territories explored by them in 1804–'6, the locality in question is thus designated: "Here the different Tribes meet in Friendship and collect Stone for Pipes." Yet, about forty years ago, when Catlin visited the Coteau des Prairies, the warlike Sioux or Dakotahs had usurped the exclusive authority over the quarry, not permitting their enemies to provide themselves with stone. Catlin and his English traveling companion encountered at first difficulties on their way to the quarry, a band of those Indians trying to prevent them from going there. "As this red stone," the warriors said, "was a part of their flesh, it would be sacrilegious for white men to touch or take it away; a hole would be made in their flesh and the blood could never be made to stop running."‡ When, subsequently, after Catlin's return from the quarry, an old chief of the Sacs saw some pieces of the red stone in the traveler's possession, he observed: "My friend, when I was young I used to go with our young men to the Mountain of the Red Pipe and dig out pieces for our pipes. We do not go now, and our red pipes, as you see, are but few. The Dakotahs have spilled the blood of the red men on that place and the Great Spirit is offended."§

Mr. Catlin is of opinion that the Indian quarrying operations at Coteau des Prairies reach back into far remote times, basing his view

* Du Pratz, Histoire de la Louisiane, Paris, 1758, Vol. I, p. 326. The passage in question is not quite clear. It remains doubtful whether DuPratz, in speaking of the stone resembling porphyry, relates what he has heard himself, or alludes to the journal of M. de Bourgmont, to which he refers on the preceding page. The last-named cavalier undertook, in 1724, an expedition to the country of the Padoucas, or Comanches. The erroneous account may be due to the natives, who purposely misplaced the locality of the quarry.

† Carver, Travels, p. 78.

‡ Catlin, Vol. II, p. 166.

§ Ibid., Vol. II, p. 171.

chiefly on the traditions of the Indians, which certainly indicate a comparatively long acquaintance with the locality. It appears, however, hardly admissible to ascribe a *very* high antiquity to the quarry, considering that thus far no pipes or objects of ornament made of the red stone have been discovered in the oldest tumuli of the Mississippi valley, and the results of a recent examination of the Coteau des Prairies by Dr. F. V. Hayden likewise tend to detract much from the supposed antiquity of this aboriginal place of resort. According to Dr. Hayden, the layer of Catlinite, hardly a foot in thickness, rests upon a gray quartzite, and there are about five feet of the same gray quartzite above it, which the Indians had to remove with great labor before the pipestone could be secured. A ditch from four to five feet wide and about five hundred yards in length indicates the extent of work done by the Indians. Only about one-fourth of the pipestone layer, thin as it is, can be used for the manufacture of pipes and other objects, the remainder being too impure, slaty, or fragile. Dr. Hayden describes the place as unpicturesque and deficient in trees. He found no stone implements in the vicinity, nor did he learn that any had ever been found; rusty iron tools, on the other hand, are frequently discovered. According to his view, the quarry belongs to a comparatively recent period.†

Nevertheless the fact seems to be well established that the surrounding tribes resorted for many succeeding generations to this locality, and that it formed a neutral ground, which they approached with a kind of superstitious awe. The Indians looked upon the red stone as a particularly valuable gift of the Great Spirit, and Catlin relates from personal observation that they humbly sacrificed tobacco before five huge boulders of granite near the quarry, in order to acquire the privilege, as it were, to take away a few pieces of the stone.‡ At present the settlements of the whites are advancing toward that interesting spot, which lies now, indeed, within the State of Minnesota, close to its western border, and in a county to which the name "Pipestone" has been given. A communication from Dr. Hayden informs me that the place is still visited by Dakotah Indians, but not very frequently, and without the observance of those ceremonies which formerly appeared indispensable. Not much longer, however, will the red man be seen to make his pilgrimage to the quarry of Coteau des Prairies.

Mr. Catlin has published very good drawings of the red pipes, which are, moreover, familiar to every one who has paid some attention to Indian matters. Some of them bear testimony to the skill and patience of their makers, who, in most cases, probably possess no other implements than the knives and files obtained from the traders. The cylindrical or conical cavities in the bowl and neck of these pipes are drilled with a hard stick and sharp sand and water.‡

---

* Hayden, in American Journal of Science and Arts, Vol. XLIII, January, 1867.
† Catlin, Vol. II, p. 166.
‡ Catlin, Vol. I, p. 234.

Not long ago a small Catlinite pipe of unusual shape was sent to me, which had been ploughed up in a maize-field near Centreville, in Southern Illinois (St. Clair County). Such older specimens are even met in the New England States, near the Atlantic coast. The collection of the Smithsonian Institute contains some pipes and ornaments made of Catlinite, which were taken from Indian graves in the State of New York, or obtained from the Iroquois still inhabiting the same State. The raw or worked red pipestone, therefore, constituted an article of barter, which was brought from its original place of occurrence to the present Eastern States of the Union. A passage in Loskiel, who chiefly treats of the Delawares and Iroquois, refers to this trade. In describing the pipes of those Indians, he says: "Some are manufactured from a kind of red stone, which is sometimes brought for sale by Indians who live near the Marble river, on the western side of the Mississippi, where they extract it (*sic*) from a mountain."* This passage, it will be noticed, implies a direct trade-connection of great extent, the distance between the red pipestone quarry and the Northern Atlantic States being equal to twelve or thirteen hundred English miles.

SHELLS.

A substance pleasing to the eye, and easily worked, such as is offered by nature in the shells of marine and fresh-water mollusks, could not fail to attract the attention of men in the earliest times. The love of personal adornment, moreover, already manifests itself in the lowest stages of human development,† and shells being, above other natural productions, particularly fitted to be made into ornaments, it is not surprising that they were employed for that purpose in all parts of the world. The North American tribes made an extensive use of the shells of the sea-coast as well as of those of their rivers, and fossil marine shells were also employed as ornaments. The valves of recent marine mollusks, indeed, must have been widely circulated by barter, considering that they are found, in the shape of ornaments, and sometimes of utensils, in the interior of North America, at great distances from the shores of the sea. The oldest reference to the shell-trade among the aborigines is contained in the remarkable account of the Spaniard Alvar Nuñez Cabeça de Vaca, who accompanied in the year 1527, as treasurer and alguazil mayor, the unfortunate Pamphilo de Narvaez on

* Loskiel, Mission der evangelischen Brüder unter den Indianern in Nordamerika, Barby, 1789, p. 66.

† It is probable that the barbarous manufacturers of the rude flint tools found, associated with the bones of extinct animals, in the diluvial deposits of Northern France, used sucl round petrefacts of the chalk (*Coscinopora globularis*, D'Orb.) as beads, by stringing them together, these petrified bodies being provided by nature with holes passing through their middle (Lyell, Antiquity of Man, p. 119). Personal vanity is a prominent feature in the character of the North American Indians. Among the miserable Root-Diggers an old woman has been seen, who "had absolutely nothing on her person but a thread round her neck, from which was pendent a solitary bead." (Irving, Adventures of Captain Bonneville, p. 261.)

his expedition for the conquest of Florida The leader and nearly all his followers having perished, Cabeça de Vaca, one of the survivors, wandered with his companions for many years through North America, until he finally succeeded in reaching the settlements of his countrymen near Culiacan, in the present Mexican province of Sinaloa, after having traversed the whole continent from the Floridian peninsula to the Pacific coast. The description of his adventures and sufferings forms one of the most remarkable early works on North America, being, indeed, the first that treats of the interior of the country and of its native population. For the latter reason it is of particular value to the ethnologist, presenting, as it does, the Indians as they were seen by the first white visitors.* While he sojourned among the Charruco Indians, a tribe inhabiting the coast, he carried on the business of a trader, which, as he observes, suited him very well, because it protected him at least from starvation. The excursions undertaken in the pursuit of his trade sometimes extended as far as forty or fifty leagues from the coast into the interior of the district. His wares consisted of pieces and "hearts" of sea-shells (*pedaços de caracoles de la mar y coraçones de ellos*), of shells employed by the Indians as cutting implements, and of a smaller kind that was used as money. These objects of trade he transported to parts distant from the sea, exchanging them there for other articles of which the coast-people were in want, such as hides, a red earth for painting their faces, stones for arrowheads, hard reeds for shafting the latter, and, finally, tufts of deer's hair dyed of a scarlet color, which were worn as head-dresses.† This passage, indeed, is of particular interest in connection with the subject treated in this essay, because it affords not only some insight into the system of Indian trade, but likewise informs us that among the objects of exchange those were conspicuous which served for the gratification of personal vanity. By the "hearts" of sea-shells Cabeça de Vaca understands the spines or *columellæ* of large conchs, which parts were worked by the aborigines into a kind of ornament, of which more will be said hereafter.

Large quantities of shell-ornaments, mostly destined to be strung together or to be worn as pendants, have been found in the sepulchral mounds and other burial-places of the Indian race. In Ohio, according to Messrs. Squier and Davis, beads made of shell and other mate-

* The importance of Cabeça de Vaca's work, it seems to me, has been undervalued, perhaps on account of the marvelous cures which he pretends to have performed among the natives. Imbued with the superstitions of his time, he probably believed in his own powers of healing the sick in a supernatural way. When these incredible details are taken away, there remains much in the book that deserves the highest appreciation. According to Arthur Helps, a most careful investigator, his account "bears every mark of truthfulness." See: Helps, The Spanish Conquest in America, Harper's edition, Vol. IV, p. 397.

† Relation et Naufrages d'Alvar Nuñez Cabeça de Vaca, (Ternaux-Compans Collection), Paris, 1837, p. 121, &c. The Spanish original appeared in the year 1555 at Valladolid.

rials occur even more frequently in the sacrificial mounds than in those of a sepulchral character, a circumstance that may be accounted for by the value attached to these objects by their owners, who deemed them worthy of being offered in their sacrificial rites. The methods employed by the manufacturers doubtless being of the most primitive character, each shell-bead was the result of a certain amount of patient labor, and consequently was esteemed according to the time and art bestowed on its production.

The Indian shell-ornament in its simplest form consisted of entire specimens of small marine univalves, such as species of *Marginella*, *Natica*, and *Oliva*, which, after being conveniently pierced, could be strung together at once without further preparation, and worn as necklaces, armlets, &c. The above-mentioned kinds were met by Squier and Davis in the mounds of Ohio, and in opening the Grave Creek Mound five hundred specimens of Marginella were obtained near one of the skeletons. Some time ago, I received pierced specimens of Marginella, recovered in removing a mound at East St. Louis, in Southern Illinois, which, I believe, contained a great number of them. Small sea-shells appear to be particularly abundant in the Indian graves of the Gulf States. More than a hundred years ago, it was noticed by Carver that sea-shells were much worn by the Indians of the interior parts—he chiefly refers to the Dakotahs on the Upper Mississippi—and reckoned very ornamental. He could not learn how they procured them, but thought they were obtained by traffic with other nations nearer the sea.* Small *fossil* marine shells were sometimes used for the same purpose. In an article published in the Smithsonian Report for 1868, I have stated that a large number of such fossil shells were found, associated with agricultural flint implements, under the surface at East St. Louis, the place already mentioned.† They belonged almost exclusively to the genus *Conovulus* (*Melampus*), and many of them were prepared for stringing by a lateral perforation, as shown in the drawing (on p. 404) representing one of those shells. My knowledge, however, that the Indians used small fossil sea-shells as ornaments is not confined to the case in question, and I presume that many of the small marine shells taken from the mounds, which are considered as belonging to recent species, are, in reality, of fossil origin. Other fossil remains in a worked state, it may be mentioned in this connection, were obtained from the mounds of Ohio, as, for instance, shark's teeth, and others of considerable size, perhaps belonging to a cetaceous animal. The former are notched on both sides, or pierced at the lower end, and may have served, respectively, as amulets, arrowheads, or cutting implements.

Yet, the number of entire sea-shells employed as beads by the natives

* Carver, Travels, p. 151.

† Their fossil character was first pointed out to me by a competent conchologist, Mr. Thomas Bland, of Brooklyn.

appears insignificant when compared with the enormous quantity of objects of the same class, which they manufactured from fragments of the valves of marine and fluviatile shells. These wrought beads exhibit various forms and sizes, but, according to my experience, are mostly found in the shape of more or less regular sections of cylinders, pierced through the centre. They are often proportionately thick, but sometimes rather thin, resembling the small bone buttons of commerce. I have shell-beads from different parts of the United States. Most of them are small, not exceeding six or seven millimetres in diameter; my largest specimens, however, have a diameter of no less than twenty-eight millimetres. These latter, which were found, some time ago, with skeletons in the now leveled "Big Mound" at St. Louis, are very flat in proportion to their diameter, and may be called discs rather than beads. They are evidently made from the valves of species of *Unio* of the Mississippi valley. These and other shells, which abound in many rivers of the United States, frequently may have furnished the material for ornaments, especially in districts remote from the sea-coast. The holes of Indian shell-beads generally are drilled from both sides, and therefore mostly of a bi-conical shape.* The colored glass beads and enameled beads often found in Indian graves are, of course, of European origin, the art of making them being unknown to the aborigines, and their occurrence in Indian burial-places, therefore, indicates that the interment took place at a period when an intercourse with the whites already had been established. Of the so-called wampum-beads I shall speak at the close of this section.

The largest and therefore the most esteemed beads and pendants, however, were made by the Indians from the columellæ, or, as Cabeça de Vaca expresses it, from the "hearts," of large conchs, among which the *Strombus gigas* seems to have been most frequently used. These beads are more or less cylindrical, or globular, and always drilled lengthwise. Some are tapering at both ends, resembling a cigar in shape. I have seen specimens of two and one-half inches in length. The aborigines also made from the columellæ of large marine univalves peculiar pin-shaped articles, consisting of a more or less massive stem, which terminates in a round knob. Professor Wyman mentions, in the Third Annual Report on the Peabody Museum (1870), a specimen of this kind found in Tennessee, which is five inches long, with a head an inch in diameter. In the collection of Colonel Charles C. Jones, of Brooklyn, there are quite similar specimens of this class. Their destination is yet unex-

* Flat shell-beads are among the oldest antiquities of Europe. Lartet found them in the grotto of Aurignac, which served as a burial-place at a period, when the cave-bear, cave-hyena, mammoth, rhinoceros, &c., still existed. Some small flat beads in my possession, made of *Cardium*, which were obtained from a dolmen in Southern France, cannot be distinguished from similar productions of the North American Indians. Entire sea-shells (mostly *Litorina litorea*), pierced for stringing, occurred in the cave of Cro-Magnon, in the valley of the Vèzére. Pierced valves of fossil sea-shells were found at other stations of the reindeer-period in the same valley, &c.

plained; they were perhaps attached to the head-dress, or worn as ornaments in some other way. The unwrought columellæ of large sea-shells have been found at considerable distances from the coast, as, for instance, in Ohio and Tennessee.

I have seen some very old Indian shell-ornaments, which were worn suspended from the neck, like medals or gorgets. They are round or oval plates, from two to four inches in diameter, on which various designs, sometimes quite tasteful, are engraved or *cut through*. In some instances their ornamentation consists in regularly disposed perforations.*

Very large sea-shells of the univalve kind, either in their natural state or more or less changed by art, frequently have been found in Indian burial-places and in localities generally, where the traces of Indian occupancy are met. Species of the *Pyrula* and *Cassis* occur most frequently. By the removal of the inner whorls and spines, and other modifications, these shells are sometimes prepared to serve as drinking-vessels and dishes. Professor Wyman speaks in the before-mentioned report of such vessels obtained from Tennessee and Florida, which are made from shells of the *Pyrula perversa*, Lam. One of the vessels measures a foot in length, though the pointed end is wanting. Dr. Troost gives the description and representation of a large, entirely hollowed *Cassis flammea*, Lam., found in Tennessee, which served as the receptacle of a kneeling human figure of clay, to which he attributes the character of an idol.† I saw in the collection of Colonel Jones, of Brooklyn, a *Cassis*, likewise hollowed, which is eight inches and a half long, and has a diameter of seven inches, where its periphery is widest. This specimen is one of two which were found near Clarksville, Habersham County, Georgia, in one of those Indian stone-graves, which are met, sometimes many of them together, in various parts of the United States.‡

In the State of Ohio, where the former inhabitants have left the most conspicuous traces of their occupancy in the shape of numerous earth-

* "They oftentimes make, of this shell, a sort of gorge, which they wear about their neck in a string; so it hangs on their collar, whereon sometimes is engraven a cross, or some odd sort of figure, which comes next in their fancy. The gorges will sometimes sell for three or four buckskins ready dressed." Lawson, History of Carolina, London, 1714; reprint, Raleigh, 1860, p. 315. For drawings see Schoolcraft, Vol. I, plate 19, figure 3, and plate 25, figures 29 and 30; also, Morgan, League of the Iroquois, p. 389.

† Transactions of the American Ethnological Society, Vol. I, p. 361.

‡ The stone-grave in question contained a skeleton, much decayed, and, besides the two *Cassis*-shells, stone axes and chisels, some perforated objects of stone, &c. The most important piece, however, was a copper axe, which deserves particular mention. This axe is very long, but narrow and thin, and shows on both sides very distinctly the friction produced by having been inserted into the split end of a wooden handle. The objects found in this grave are all in the possession of Colonel Jones, who intends to publish an illustrated description of this find in his forthcoming work on the antiquities of Georgia.

works of various descriptions, and sometimes of stupendous extent, these large shells of marine mollusks are of frequent occurrence. Atwater already mentions them in the first volume of the Archæologia Americana, published in 1820. What Squier and Davis observed in regard to sea-shells generally during their investigations in Ohio, I will recapitulate here in a few words. They found in the mounds the smaller shells already specified, namely, *Marginella*, *Oliva*, and *Natica*, as well as entire specimens or fragments of *Cassis* and *Pyrula perversa*, and also the unwrought columellæ of a large species of conch, probably *Strombus gigas*. Entire specimens of the *Pyrula perversa*, they state, frequently have been discovered outside of the mounds, in excavating at different points in the Scioto valley. They found in one of the mounds a large *Cassis*, from which the inner whorls and columella had been removed, to adapt it for use as a vessel. This specimen, eleven inches and a half in length by twenty-four in circumference at the largest part, is now in the Blackmore Museum.*

The above-mentioned marine shells, all pertaining to tropical or semi-tropical regions, occur in the United States only on the eastern shore of the peninsula of Florida (perhaps a little higher northward) and on the coast of the Gulf of Mexico. From these localities, therefore, they must have found their way into the interior. Adopting, for example, Cape St. Blas, in the Mexican Gulf, and the centre of Ohio as the limits of shell-trade from south to north (an estimate probably much below reality), we find an intervening distance of nearly eight hundred English miles.

Having repeatedly alluded to large sea-shells prepared by the aborigines to serve as vessels, I will also mention that the Florida Indians, when first seen by Europeans, used such shells as drinking-cups. This we learn from the plates and descriptions contained in the "Brevis Narratio," of Jacques le Moyne de Morgues, in the second volume of DeBry's "Peregrinationes" (Francoforti ad Moenum, 1591). Plate 19 represents Indian widows who have cut off their hair in token of mourning, and scatter it over the graves of their husbands. On the graves are deposited bows and arrows, spears, and the large shells "out of which they drank."† The same shells may be seen on Plate 29, where warriors use them as drinking-cups. Plate 40, finally, illustrates the ceremonies which were performed at the death of a chieftain. The tumulus is already heaped up, and around its base arrows are stuck perpendicularly in the ground. The drinking-vessel of the deceased, a large shell, is placed on the top of the mound.‡ Though the shells are figured quite large in these plates, it is impossible to perceive to what species they

*Ancient Monuments, p. 283.

†The accompanying text runs thus: "*Ad maritorum sepulcra pervenientes, capillos sub auribus præsecant, illisque per sepulcra sparsis, maritorum arma & conchas ex quibus bibebant ibidem abjiciunt, in strenuorum virorum memoriam.*"

‡In the text: "*Defuncto aliquo Rege ejus Provinciæ, magna solennitate sepelitur, & ejus tumulo crater, e quo bibere solebat, imponitur, defixis circa ipsum tumulum multis sagittis.*"

belong. Le Moyne drew his scenes of Indian life many years after his return from America, while living in England, and as he executed these delineations from memory, they are doubtless deficient in that minuteness of detail which authorizes safe comparisons and deductions.

Among some tribes of the interior marine shells seem to have been looked upon with a kind of religious reverence, and indications are not wanting that they played a part in their religious ceremonies. The peculiar sound produced by a sea-shell when approached to the ear necessarily appeared strange and mysterious to them, and the rareness of the shells, together with their elegant forms and beautiful colors, doubtless increased their value in the eyes of the natives. According to Long, the Omahas possessed, about half a century ago, a large shell (already transmitted from generation to generation) to which they paid an almost religious veneration. "A skin lodge or temple," says Long, "is appropriated for its preservation, in which a person constantly resides, charged with the care of it, and appointed its guard. It is placed upon a stand and is never suffered to touch the earth. It is concealed from the sight by several envelops, which are composed of strands of the proper skins, plaited and joined together in the form of a mat. The whole constitutes a parcel of considerable size, from which various articles are suspended, such as tobacco and roots of certain plants. No person dares to open all the coverings of this sacred deposit in order to expose the shell to view. Tradition informs them that curiosity induced three different persons to examine the mysterious shell, who were immediately punished for their profanation by instant and total loss of sight. The last of these offenders, whose name is Ish-ka-tappe, is still living. It was ten years since that he attempted so unveil the sacred shell, but, like his predecessors, he was visited with blindness, which still continues, and is attributed by the Indians, as well as by himself, to his committing of the forbidden act. This shell is taken with the band to all the national hunts, and is then transported on the back of a man. Previously to undertaking a national expedition against an enemy, the sacred shell is consulted as an oracle. For this purpose the magi of the band seat themselves around the great medicine lodge, the lower part of which is then thrown up like curtains and the exterior envelop is carefully removed from the mysterious parcel, that the shell may receive air. A portion of the tobacco, consecrated by being long suspended to the skin-mats or coverings of the shell, is now taken and distributed to the magi, who fill their pipes with it to smoke to the great medicine. During this ceremony an individual occasionally inclines his head forward and listens attentively to catch some sound which he expects to issue from the shell. At length, some one imagines that he hears a sound like that of a forced expiration of air from the lungs, or like the noise made by the report of a gun at a great distance. This is considered as a favorable omen, and the nation prepare for the projected expedition with a confidence of success. But, on the contrary, should no

sound be perceived, the issue of the expedition would be considered doubtful."* This shell, it cannot be doubted, was of marine origin, though the fact is not stated in the text. The nearest sea-coast from which it could have been obtained is that of the Mexican Gulf, distant about nine hundred miles from the district inhabited by the Omahas.

The white traders used to derive great profit by selling fine sea-shells to the tribes of the interior. Kohl, for instance, learned from Canadian fur-traders that the Ojibways, on Lake Superior, formerly purchased sea-shells from them at considerable prices. "When they (the traders) exhibited a fine large shell, and held it to the ears of the Indians, these latter were astonished, saying they heard the roaring of the ocean in it, and paid for such a marvelous shell furs to the value of thirty or forty dollars, and even more."†

Having undertaken to compose this essay for the purpose of bringing together a series of facts relating to the trade among the aborigines of North America, I would be guilty of an omission, if I neglected to mention the wampum-beads, which, besides other uses, represented the *money* among them. The term "wampum" is often applied to shell-beads in general, but should be confined, I think, to a certain class of cylindrical beads, usually one-fourth of an inch long and drilled lengthwise, which were chiefly manufactured from the shells of the common hard-shell clam (*Venus mercenaria*, Lin). This bivalve occurring, as every one knows, in great abundance on the North American coasts, formed an important article of food of the Indians living near the sea, a fact demonstrated by the enormous quantity of castaway clam-shells, which form a considerable part of North American *Kjoekkenmoeddings*. The natives used to string the mollusks and to dry them for consumption during winter. The blue or violet portions of the clam-shells furnished the material for the dark wampum, which was held in much higher estimation than that made of the white part of the shells, or of the spines of certain univales. Even at the present time places are pointed out on the Atlantic sea-board, for example on that of Long Island, where the Indians manufactured wampum, and such localities may be recognized by the accumulations of clam-shells from which the blue portions are broken off.

Wampum-beads formed a favorite material for the manufacture of necklaces, bracelets, and other articles of ornament, and they constituted the strings and belts of wampum, which played such a conspicuous part in Indian history.

Loskiel makes the following statement in reference to wampum: "Before North America was discovered by the Europeans, the Indians mostly made their strings and belts of small pieces of wood, cut to an equal size and dyed white and black. They made some of shells, which

* Long, Expedition from Pittsburgh to the Rocky Mountains, performed in the years 1819 and 1820, London, 1823, Vol. II, p. 47, &c.

† Kohl, Kitschi-Gami, Vol. I, p. 186.

they highly esteemed, but they manufactured them very rarely, because this labor required much time for want of the proper tools; and the beads, moreover, were of a rude and clumsy appearance. Soon after their arrival in America, the Europeans began to manufacture wampum from shells, very neatly and in abundance, exchanging it to the Indians for other commodities, thus carrying on a very profitable trade. The Indians now abandoned their wooden belts and strings, and substituted those of shell. The latter, of course, gradually declined in value, but, nevertheless, were and still are much prized."*

I have little faith in Loskiel's statement that the Indians chiefly used wood for the above-mentioned purpose, before they had intercourse with the whites. Loskiel never visited America; he composed, as he observes in the preface, his work from the journals and reports of Protestant missionaries, and probably was totally unacquainted with the early writings relating to North America, in which wampum is mentioned. Roger Williams, for example, who emigrated to North America in 1631, is quite explicit on that point. He states that the Indians manufactured white and dark wampum-beads, and that six of the former and three of the latter were equivalent to an English penny. Yet it appears that even at his time the colonists imitated the wampum, and used it in their trade with the natives. "The Indians," he says, "bring downe all their sorts of Furs, which they take in the countrey, both to the Indians and to the English for this Indian Money: this Money the English, French, and Dutch, trade to the Indians, six hundred miles in severall parts (North and South from New-England) for their Furres, and whatsoever they stand in need of from them: as Corne, Venison, &c."† Similar statements are contained in the writings and records of various persons who lived in North America contemporaneously with the liberal-minded founder of Rhode Island. Even in the intercourse of the English colonists among themselves, wampum served at certain periods instead of the common currency, and the courts of New England issued from time to time regulations for fixing the money-value of the wampum. In transactions of some importance it was measured by the fathom, the dark or blue kind generally being double the value of the white.‡ According to Roger Williams, the Indians of New England—he chiefly refers to the Narragansetts—denoted by the term *wompam* (which signifies *white*) the white beads, while they called the dark kind *suckauhock* (from *sácki*, *black*).§ The great value attached to wampum as an ornament is well illustrated by the following passage from the same author: "They hang these strings of money about their necks and wrists; as also upon

* Loskiel, Mission der evangelischen Brüder, &c., p. 34.

† Roger Williams, A Key, &c., p. 128.

‡ Interesting details concerning wampum are given by Mr. Stevens in "Flint Chips," London, 1870, pp. 454–64.

§ Roger Williams, l. c. p. 130. In another place (p. 154) he gives the word *wómpi* for *white*. *Wampumpeage*, *peak*, *seawant*, *roanok*, were other names to signify wampum.

the necks and wrists of their wives and children. *Máchequoce*, a Girdle; which they make curiously of one, two, three, foure, and five inches thicknesse and more, of this money which (sometimes to the value of ten pounds and more) they weare about their middle and as a scarfe about their shoulders and breasts. Yea, the Princes make rich Caps and Aprons (or small breeches) of these Beads thus curiously strung into many formes and figures: their blacke and white finely mixt together."*

The wampum-belts, so often mentioned in connection with the history of the eastern tribes, consisted of broad straps of leather, upon which white and blue wampum-beads were sewed in rows, being so arranged that by the contrast of the light and dark colors certain figures were produced. The Indians, it is well known, exchanged these belts at the conclusion of peace, and on other solemn occasions, in order to ratify the transaction and to perpetuate the remembrance of the event. When sharp admonitions or threatening demonstrations were deemed necessary, the wampum-belts likewise played a part, and they were even sent as challenges of war. In these various cases the arrangement of the colors and figures of the belts corresponded to the object in view: on peaceable occasions the white color predominated; if the complications were of a serious character, the dark prevailed; and in the case of a declaration of war, it is stated, the belt was entirely of a somber hue, and, moreover, covered with red paint, while there appeared in the middle the figure of a hatchet executed in white. The old accounts, however, are not quite accordant concerning these details, probably because the different Atlantic tribes followed in this particular their own taste rather than a general rule. At any rate, however, the wampum-belts were considered as objects of importance, being, as has been stated, the tokens by which the memory of remarkable events was transmitted to posterity. They were employed somewhat in the manner of the Peruvian *quipu*, which they also resembled in that particular, that their meaning could not be conveyed without oral comment. At certain times the belts were exhibited, and their relations to former occurrences explained. This was done by the aged and experienced of the tribe, in the presence of young men, who made themselves thoroughly acquainted with the shape, size, and marks of the belts as well as with the events they were destined to commemorate, in order to be able to transmit these details to others at a future time. Thus the wampum-belts represented the archives of polished nations. Among the Iroquois tribes, who formed the celebrated "league," there was a special "keeper of the wampum," whose duty it was to preserve the belts and to interpret their meaning, when required. This office, which bore some resemblance to that of the quipu-decipherer (*quipu-camayoc*) of the Peruvians, was intrusted to a sachem of the Onondagas.†

In March, 1864, a delegation of Iroquois of the State of New York

* Ibid., p. 131.

† Morgan, League of the Iroquois, p. 121.

passed through New York City on their way to Washington, where they intended to negotiate with the Government concerning former treaties relative to their lands. They had brought with them their old wampum-belts, as documents to prove the justness of their claims. One of these belts, if I am not mistaken, had been given them by General Washington on some important occasion; for even the whites of that period were under the necessity of conforming to the established rule in their transactions with the natives. The New York Historical Society honored these delegates with a public reception, which ceremony took place in the large hall of the Society. The president delivered the speech of welcome, which an old chief, unable to express himself in English, answered in the Seneca dialect. A younger chief, Dr. Peter Wilson, called by the people of his tribe *De-jih-non-da-weh-hoh*, or the "Pacificator," served as interpreter, being well versed in both languages. He afterward exhibited the belts, and explained their significance. They were, as far as I can recollect, about two feet long and of a hand's breadth. The ground consisted of white beads, while blue ones formed the figures or marks. The latter resembled ornamental designs, and I could not discover in them the form of any known object. I compared them at the time to somewhat roughly executed embroideries of simple patterns. I asked the "Pacificator" whether these belts were the work of Indians or of whites; but he was unable to give me any definite information on that point.*

I possess a number of white and blue wampum-beads from an Indian grave, opened in 1861, near Charlestown, in the State of Rhode Island. The late Dr. Usher Parsons, of Providence, Rhode Island, to whom I am indebted for these beads, has described the grave,† and thinks it enclosed the remains of a daughter of Ninigret, Sachem of the Niantic or Nahantic tribe of Indians. The interment is supposed to have taken place about the year 1660. These beads are regularly worked cylinders, drilled lengthwise, and from five to nine millimetres in length, by four or five in diameter. Of course, it cannot now be decided whether Indians or whites were their manufacturers. The grave contained many other objects, but almost without exception derived from the colonists of that period. I may also state, in this place, that thus far I have not found in the oldest English works on North America a perfectly satisfactory account of the method originally employed by the Indians in the manufacture, and especially in the drilling, of the wampum-beads.‡

Among the tribes of the northwestern coast of North America, from

* This is the same chief who delivered, in 1847, before the New York Historical Society, a powerful speech, quoted by Morgan, (League of the Iroquois, p. 440). The chief's name was then *Wä-o-wo-wä-nó-onk*.

† New York Historical Magazine, February, 1863.

‡ "Before ever they had awle blades from Europe, they made shift to bore this their shell money, with stones, and to fell their trees with stone set in a wooden staff, and used wooden howes; which some old and poore women (fearfull to leave the old tradition) use to this day."—*Roger Williams, Key*, p. 130.

the northern border of California far upward to the north, the shells of the *Dentalium* represented, until within the latest time, the wampum of the Atlantic region, being used, like the latter, both as ornament and money. These shells, which abound in certain places of the Pacific coast, may be likened to small, tapering, and somewhat curved tubes. Being open at both ends, they can be strung without further preparation. As my essay relates only to that portion of North America which lies east of the Rocky Mountains, I probably would not have mentioned the use of Dentalium-shells, were it not for the fact that they have been found in the interior of the country, far from the Pacific coast, as personal ornament of existing tribes, and even in the ancient mounds of Ohio.* The latter fact, indeed, is of great interest in its bearing on the extent of former aboriginal trade-relations, the distance from the Pacific to the State of Ohio being almost equal to the whole breadth of the North American continent.†

PEARLS.

Perforated pearls, destined to serve as beads, often form a part of the contents of ancient North American mounds. Squier and Davis found them on the hearths of five distinct groups of mounds in Ohio, and sometimes in such abundance that they could be gathered by the hundred. Most of them had greatly suffered by the action of fire, being in many cases so calcined that they crumbled when handled; yet, several hundred were found sufficiently well preserved to permit of their being strung. The pearls in question are generally of irregular form, mostly pear-shaped, though perfectly round ones are also among them. The smaller specimens measure about one-fourth of an inch in diameter, but the largest has a diameter of no less than three-fourths of an inch.‡ According to Squier and Davis, pearl-bearing shells occur in the rivers of the region whose antiquities they describe, but not in such abundance that they could have furnished the amount discovered in the tumuli; and the pearls of these fluviatile shells, moreover, are said to be far inferior in size to those recovered from the altars. The latter, they think, were derived from the Atlantic coast and from that of the Mexican Gulf. It is a fact that the Indians, who inhabited the present Southern States of the Union, made an extensive use of pearls for ornamental purposes. This is attested by the earliest accounts, and more especially by the chroniclers of De Soto's expedition (the anonymous Portuguese gentleman and Garcilasso de la Vega), who speak of almost fabulous quantities of pearls, which that daring leader and his followers

* Stevens, Flint Chips, p. 468.

† Since writing the above, I learned, by consulting Woodward's work on conchology, that the *Dentalium* is also found in the West Indies. If it should likewise occur on the southern coasts of the United States, there is at least a possibility that the specimens found in Ohio may have been obtained from the last-named region.

‡ Ancient Monuments, p. 232

saw among the Indians of the parts traversed by them. Pearls, however, belonged to the things most desired by the Spaniards, and the accounts relating to them, perhaps, may be somewhat exaggerated. The following passage from Garcilasso de la Vega is of particular interest:

"While De Soto sojourned in the province of Ichiaha,* the cacique visited him one day, and gave him a string of pearls about two fathoms (*deux brasses*) long. This present might have been considered a valuable one, if the pearls had not been pierced; for they were all of equal size and as large as hazle-nuts.† Soto acknowledged this favor by presenting the Indian with some pieces of velvet and cloth, which were highly appreciated by the latter. He then asked him concerning the pearl-fishing, upon which he replied that this was done in his province. A great number of pearls were stored in the temple of the town of Ichiaha, where his ancestors were buried, and he might take as many of them as he pleased. The general expressed his obligation, but observed that he would take away nothing from the temple, and that he had accepted his present only to please him. He wished to learn, however, in what manner the pearls were extracted from the shells. The cacique replied that he would send out people to fish for pearls all night, and on the following day at eight o'clock (*sic*) his wish should be gratified. He ordered at once four boats to be dispatched for pearl-fishing, which should be back in the morning. In the mean time much wood was burned on the bank, producing a large quantity of glowing coals. When the boats had returned, the shells were placed on the hot coals, and they opened in consequence of the heat. In the very first, ten or twelve pearls of the size of a pea were found, and handed to the cacique and the general, who were present. They thought them very fine, though the fire had partly deprived them of their lustre. When the general had satisfied his curiosity, he retired to take his dinner. While thus engaged, a soldier came in, who told him that in eating some of the oysters caught by the Indians, a very fine and brilliant pearl had got between his teeth, and he begged him to accept it as a present for the governess of Cuba.‡ Soto very civilly refused the present, but assured the soldier that he was just as much obliged to him as though he had accepted his gift: he would try to reward him one day for his kindness and for the regard he was showing to his wife. He advised him to keep his (intended) present, and to buy horses for it at Havana. The Spaniards, who were with the general at that moment, examined the pearl of this soldier, and some, who considered themselves as experts in the matter of jewelry, thought it was worth four hundred ducats. It had re-

* The province and town of Iciaha, or Ichiaha, have been located in that part of Northern Georgia where the Oostanaula and Etowah rivers unite, and form the Coosa river. (See Theodore Irving's "Conquest of Florida," second edition, p. 242; also McCulloh's "Researches," p. 525.)

† The Indians used to pierce them with a heated copper wire, a process by which they were spoiled.

‡ Doña Isabel de Bobadilla, De Soto's wife.

tained its original lustre, not having been extracted by means of fire."*

It is evident, therefore, that the Indians obtained their pearls, in part at least, from their river-muscles, many of which are known to be margaritiferous.† These mollusks undoubtedly were used as food by the aborigines, who ate alligators, snakes, and other animals less tempting than the contents of fluviatile shells. Indeed, I learned from Dr. Brinton, who was attached to the Army of the Cumberland during the late civil war, that muscles of the Tennessee river were occasionally eaten "as a change" by the soldiers of that corps, and pronounced no bad article of diet. Shells of the *Unio* are sometimes found in Indian graves, where they had been deposited with the dead, to serve as food during the journey to the land of spirits. In many parts of the North American inland heaps of fresh-water shells are seen, indicating the places where the natives feasted upon the mollusks. Atwater has drawn attention to such accumulations on the banks of the Muskingum, in Ohio.‡ Heaps of muscle-shells may be seen in Alabama, along the rivers wherever Indians used to live. Thousands of the shells lie banked up, some deep in the ground.§ Dr. Brinton saw on the Tennessee river and its tributaries numerous shell-heaps, consisting almost exclusively of the *Unio virginianus* (Lamarck?). In all instances he found the shell-heaps close to the water-courses, on the rich alluvial bottom-lands. "The mollusks," he says, "had evidently been opened by placing them on a fire. The Tennessee muscle is pearl-bearing, and there is no doubt but that it was from this species that the early tribes obtained the hoards of pearls which the historians of De Soto's exploration estimated by bushels, and which were so much prized as ornaments. It is still a profitable employment, the jewelers buying them at prices varying from one to fifty dollars."‖ *Kjoekkenmoeddings* on the St. John's river, in Florida, consisting of river-shells, were examined by Professor Wyman, and described by him; he saw similar accumulations on the banks of the Concord river in Massachusetts, and was informed by eye-witnesses that they are numerous in California.¶ On Stalling's Island, in the Savannah river, more than two hundred miles above its mouth, there stands a mound of elliptical shape, chiefly composed of the muscles, clams, and snail-shells of the river. This tumu-

* Garcilasso de la Vega, Conquête de la Floride, Vol. II, p. 296.

† As Mr. Isaac Lea, of Philadelphia, informs me, pearls are found in various species of the *Unionidæ*, more frequently in *Unio complanatus*, *Margaritana margaritifera*, and *Anodonta fluviatilis*. But they occur occasionally in all the species of this family. Very large and valuable pearls have been found in New Jersey.

‡ Archæologia Americana, Vol. i, p. 226.

§ Pickett, History of Alabama, Charleston, 1851, Vol. I p. 12.

‖ Brinton, Artificial Shell-Deposits in the United States, Smithsonian Report for 1866, p. 357.

¶ Wyman, Fresh-Water Shell-Heaps of the St. John's River, East Florida, Salem, Massachusetts, 1868, p. 6.

lus, which is about three hundred feet long, one hundred and twenty feet wide, and, perhaps, over twenty feet high, was found to contain a large number of skeletons. "Several pits have been opened in the northeastern end. At the depth of twelve feet the amount of shells was undiminished. They appear to have been distributed in layers of eight or ten inches in thickness, with intervening strata of sand. An examination into the contents of the mound proves conclusively that it must have been used only for burial purposes; that it is, in fact, a huge necropolis. It could not have been the work of a year, or of a generation. Stratum upon stratum has been heaped, each covering the dead of its age, until by degrees, and with the lapse of time, it grew into its present surprising dimensions."*

It is probable that the natives of North America obtained pearls, both from fluviatile and marine shells, and further that they caught the bivalves, not solely on account of the pearls they inclosed, but for using them as food. The pearls themselves, in all likelihood, were looked upon as additional, highly valued gifts of nature.

DIVISION OF LABOR.

Among the later Indians, at least those who lived east of the Rocky Mountains, nearly all work was performed by women. When, during times of peace, the master of a lodge had supplied his family with the game necessary for its support, he thought to be relieved of further duties, and abandoned himself either to indolence or to his favorite pastimes, such as games of hazard, and exercises calculated to impart strength and agility to the body. He manufactured, however, his arms and kept them in repair, and also condescended to work, when a larger object, a canoe for instance, was to be made, or a dwelling to be constructed. Far more varied, on the other hand, were the duties imposed upon women. Not only had they to procure water and fire-wood, to prepare the meals, to collect the fruits serving as winter-provisions, to make moccasins and other articles of dress, but it was also incumbent upon them to perform many other labors, which, from their nature, would seem to be more suited for men. Thus, the fields were cultivated by women;† they dressed the skins to fit them for garments and other purposes; the manufacture of pottery was a branch of female industry; they did the principal work in the erection of the huts or tents (of skins, mats or bark), and their assistance was even required when canoes, especially those of bark, were made. During the march they carried heavy loads, and on the water they handled the paddle as skilfully as the men. If to all those tasks and toils the bringing up of children is added, the lot of the Indian woman appears by no means an enviable one, though she bore her burden patiently, not being accustomed to a different manner of existence. She was, indeed, hardly more than the servant of her lord

* Jones (Charles C.), Monumental Remains of Georgia, Savannah, 1861, p. 14.

† Also, to some extent, by enslaved prisoners of war.

and master, who frequently lived in a state of polygamy merely for commanding more assistance in his domestic affairs.

Such were the occupations of Indian men and women *in general*. Nevertheless, there are indications that the germs of handicrafts already existed among the North American tribes, or, to speak more distinctly, that certain individuals of the male sex, who were, by natural inclination or practice, particularly qualified for a distinct kind of manual labor, devoted themselves principally or entirely to this labor. I refer, of course, to the period anteceding the occupation of the country by Europeans—that period about which so little is known, that a careful examination of the still existing earth-works, and of the minor products of industry left by the former inhabitants, affords the principal guidance in the attempt to determine their mode of existence. The earliest writings on North America are exceedingly deficient in those details which are of interest to the archæologist, and form, as it were, his points of departure; and it becomes therefore necessary to adopt here, in the pursuit of archæological investigation, the same system of careful inquiry and deduction that has been so successfully employed in Europe. The only difference is, that in the latter part of the world "prehistoric times" reach back thousands of years into the remotest antiquity, while in America a comparatively recent period must be drawn within the precinct of antiquarian research.

Any one who examines a collection of North American chipped flint implements will notice quite rude and clumsy specimens, but also, alongside of these, others of great regularity and exquisite finish, which could only have been fashioned by practised workers in flint. This applies particularly to the points of arrows and lances, some of which are so sharp and pointed that they, when properly shafted, almost would be as effectual as iron ones. In fact, the oldest Spanish writings contain marvelous accounts of the penetrating force of the flint-pointed arrows used by the Indians of Florida in their encounters with the whites. Not every warrior, it may be presumed, was able to make stone-points, especially those of a superior kind, this labor requiring a skill that could only be attained by long practice. There were doubtless certain persons among the various tribes who practised arrow-making as a profession, and disposed of their manufactures by way of exchange. In reference to this subject Mr. Schoolcraft observes as follows: "A hunter, or warrior, it is true, expected to make his own arms or implements, yet the manufacture of flint and hornstone into darts and spears and arrowheads demanded too much skill and mechanical dexterity for the generality of the Indians to succeed in. According to the Ojibway tradition, before the introduction of fire-arms, there was a class of men among the northern tribes who were called *makers of arrowheads*. They selected proper stones, and devoted themselves to this art, taking in exchange for their manufactures, the skins and flesh of animals." According to Colonel Jones, the tradition has been preserved in Georgia "that among the Indians who inhabited

the mountains, there was a certain number or class who devoted their time and attention to the manufacture of these darts. That as soon as they had prepared a general supply, they left their mountain homes and visited the sea-board and intermediate localities, exchanging their spear and arrowheads for other articles not to be readily obtained in the region where they inhabited. The further fact is stated that these persons never mingled in the excitements of war; that to them a free passport was at all times granted, even among tribes actually at variance with that of which they were members; that their avocation was esteemed honorable, and they themselves treated with universal hospitality. If such was the case, it was surely a remarkable and interesting recognition of the claims of the manufacturer by an untutored race." *

In a former section I have mentioned a Californian Indian of the Shasta tribe, who was seen making arrowheads of obsidian by Mr. Caleb Lyon. "The Indian," he says, "seated himself on the floor, and, placing a stone anvil upon his knee, which was of compact talcose slate, with one blow of his agate chisel he separated the obsidian pebble into two parts, then giving another blow to the fractured side he split off a slab a fourth of an inch in thickness. Holding the piece against the anvil with the thumb and finger of his left hand, he commenced a series of continuous blows, every one of which chipped off fragments of the brittle substance. It gradually assumed the required shape. After finishing the base of the arrowhead (the whole being only a little over an inch in length) he began striking gentler blows, every one of which I expected would break it into pieces. Yet such was their adroit application, his skill and dexterity, that in little over an hour he produced a perfect obsidian arrowhead. *Among them arrow-making is a distinct trade or profession, which many attempt, but in which few attain excellence.*" †

Another method of arrow-making practised by the Californian tribes is mentioned by Mr. Edward E. Chever in an article published in the "American Naturalist," May, 1870. He has figured the implement used in the process (p. 139). "The arrow-head," he says, "is held in the left hand while the nick in the side of the tool is used as a nipper to chip off small fragments."

Mr. Catlin gives an interesting and full account of the manufacture of arrowheads among the Apaches and other tribes living west of or in the Rocky Mountains. The following extract contains his principal statements: "Erratic boulders of flint are collected (and sometimes brought an immense distance) and broken with a sort of sledge-hammer made of a rounded pebble of hornstone, set in a twisted withe, holding the stone and forming a handle. The flint, at the indiscriminate blows of the sledge, is broken into a hundred pieces. The master-workman, seated on the ground, lays one of these flakes on the palm of his left hand,

* Jones (Charles C.), Indian Remains in Southern Georgia. Address delivered before the Georgia Historical Society, Savannah, 1859, p. 19.

† Bulletin of the American Ethnological Society, New York, 1861, Vol. I, p. 39.

holding it firmly down with two or more fingers of the same hand, and with his right hand, between the thumb and two forefingers places his chisel or punch* on the point that is to be broken off; and a co-operator (a striker) sitting in front of him, with a mallet of very hard wood, strikes the chisel on the upper end, flaking the flint off on the under side, below each projecting point that is struck. The flint is then turned and chipped in the same manner from the opposite side; and so turned and chipped until the required shape and dimensions are obtained, all fractures being made on the palm of the hand, whose yielding elasticity enables the chip to come off without breaking the body of the flint, which would be the case if they were broken on a hard substance. This operation is very curious, both the holder and the striker singing, and the strokes of the mallet given exactly in time with the music, and with a sharp and *rebounding* blow, in which, the Indians tell us, is the great *medicine* (or mystery) of the operation. Every tribe has its *factory* in which these arrowheads are made, and in those *only certain adepts are able or allowed to make them for the use of the tribe.*"†

Thus tradition as well as modern experience justify the belief that the manufacture of arrow and spearheads was formerly carried on as a craft by certain individuals of the North American tribes, and Longfellow's "Ancient Arrow-maker," therefore, is not a mythical person, but the ideal type of a class of men whose art flourished in by-gone times.

The skilfully executed agricultural flint implements of East St. Louis, described by me in the Smithsonian Report for 1868, have altogether the appearance as if *one* hand had fashioned them. Is it not probable that they formed the magazine of an aboriginal artisan, who devoted his time chiefly to the manufacture of such tools? The making of wampum and of shell-beads in general may have formed a trade among the tribes inhabiting the sea-board; for this labor required much time and promised success only to those who, by long practice, had attained skill in the operation. The supposition gains some ground by an observation of Roger Williams, who states that "most on the Sea side make Money and Store up shells in Summer against Winter whereof to make their money." He further observes on the same page: "They have some who follow onely making of Bowes, some Arrowes, some Dishes (and the women make all their Earthen Vessells,) some follow fishing, some hunting."‡

The most remarkable productions of ancient aboriginal industry are the carved stone pipes of peculiar shape exhumed by Messrs. Squier and Davis from the mounds of Ohio, and minutely described and figured by them in the "Ancient Monuments of the Mississippi Valley."§

* Six or seven inches in length, and made of an incisor of the sperm-whale, often stranded on the coast of the Pacific.

† Catlin, Last Rambles amongst the Indians, New York, 1867, p. 187, &c.

‡ Roger Williams, A Key, &c., p. 133.

§ Chapter XV, Sculptures from the Mounds, pp. 242-278.

Four miles north of Chillicothe, Ohio, there lies, close to the Scioto river, an embankment of earth somewhat in the shape of a square with strongly rounded angles, and enclosing an area of thirteen acres, over which twenty-three mounds are scattered without much regularity. This work has been called "Mound City," from the great number of mounds within its walls. In digging into the mounds, Squier and Davis discovered hearths in many of them, which furnished a great number of aboriginal relics. From one of the hearths nearly two hundred of those peculiar stone pipes were taken, many of them, unfortunately, cracked by the action of the fire, and otherwise damaged. The occurrence of these "mound-pipes," however, was not confined to the mound in question, similar ones having occasionally been found elsewhere. In the more elaborate pipes from Mound City, the bowl is sometimes formed in imitation of the human head, but generally of the body of an animal, and in the latter cases the peculiar characteristics of the species which have served as models are frequently expressed with surprising fidelity. The following mammals have been recognized: the beaver, otter, elk, bear, wolf, dog, panther, wild cat, raccoon, opossum, squirrel, and sea-cow (Manati, Lamantin, *Trichecus manatus*, Lin.). Of the last-named animal, no less than seven representations were found, a circumstance deserving particular notice, because this inhabitant of tropical waters is not met in the higher latitudes of North America, but only on the coast of Florida, which is many hundred miles distant from Ohio. The Florida Indians called this animal the "big beaver," and hunted it on account of its flesh and bones.* Most frequent are carvings of birds, among which the eagle, hawk, falcon, turkey-buzzard, heron, several species of owls, the raven, swallow, paroquet, duck, and other land and water-birds, have been recognized. One of the specimens is supposed to represent the toucan, a tropical bird not inhabiting the United States. Worthy of particular mention as a well-executed sculpture is a species of eagle or hawk in the attitude of tearing a smaller bird held in its claws; and so is that of the tufted heron feeding on a fish. The amphibious animals, likewise, have their representatives in the snake, toad, frog, turtle, and alligator. One specimen shows a snake that winds itself around the bowl of the pipe. The toads, in particular, are very faithful imitations of nature. Indeed, it is said in the "Ancient Monuments" that, if placed in the grass before an unsuspecting observer, they would probably be mistaken for the natural objects; and this statement is in no way exaggerated, as every one will admit who has seen the specimens in question. The bird-figure supposed to represent the toucan, I think, is not of sufficient distinctness to identify the original that was before the artist's mind; it would not be safe, therefore, to make this specimen the subject of far-reaching speculations. For the rest, the imitated animals belong, with-

* Bartram, Travels, Dublin, 1793, p. 229.

out exception, to the North American fauna; and there is, moreover, the greatest probability that the sculptures in question were made in or near the present State of Ohio, where, in corroboration of the last supposition, a few unfinished specimens have occurred among the complete articles. The discovery of the manati-figures, however, is in so far of interest as it indicates a communication between the ancient inhabitants of Ohio and those of the Floridian coast-region.

It was formerly believed most of these pipes were composed of a kind of porphyry; but since their transfer to the Blackmore Museum, they were carefully examined and partly analyzed by Professor A. H. Church, who found them to consist of softer materials.* Nevertheless, they constitute the most remarkable class of Indian products of art thus far discovered, for some of them are so skilfully executed that a modern artist, notwithstanding his far superior instruments, would find no little difficulty in reproducing them. The manufacture of stone pipes, necessarily a painful and tedious labor, therefore may have formed a branch of aboriginal industry, and the skilful pipe-carver probably occupied among the former Indians a rank equal to that of the experienced sculptor in our time. Even among modern Indians pipe-makers sometimes have been met. Thus, Dr. Wilson mentions an old Ojibway Indian, whose name is *Pabahmesad*, or the "Flier," but who, from his skill in making pipes, is more commonly known as *Pwahguneka*—"he makes pipes."† Kohl, also, speaks of an Ojibway pipe-maker whom he met on Lake Superior. "There are persons among them," he says, "who possess particular skill in the carving of pipes, and make it their profession, or at least the means of gaining in part their livelihood. I made the acquaintance of such a *faiseur de calumet*, and visited him occasionally. He inlaid his pipes very tastefully with figures of stars and flowers of black and white stones. But his work proceeded very slowly, and he sold his pipes at high prices, from four to five dollars apiece. Yet the Indians sometimes pay much higher prices." ‡

In addition to the articles thus far enumerated, others may have been manufactured more or less extensively by way of trade; but, in default of corroborating data, we must rest satisfied with the supposition that such was the case. European archæologists, in estimating the conditions of prehistoric races of the Old World, have derived much aid from inquiries into the modes of life among still-existing primitive populations of foreign parts. The same system may be applied in antiquarian researches relative to North America, where the customs and manners of the yet lingering aboriginal population can be brought into requisition for elucidating the past. Thus, some statements made by Mr. James G. Swan, in a recent work on the Makah Indians of Cape Flattery, (published by the Smithsonian Institute,) are of great interest in

* Church, in "Flint Chips," p. 414.

† Wilson, Prehistoric Man, Lond., 1862, Vol. II, p. 15.

‡ Kohl, Kitschi-Gami, Vol. II, p. 82.

connection with the object treated in this article. "The manufacture of implements," he says, "is practised by all; some, however, producing neater articles, are more employed in this way. The manufacture of whaling implements, particularly the staff of the harpoon and the harpoon-head, is confined to individuals who dispose of them to the others. This is also the case with rope-making; although all understand the process, some are peculiarly expert, and generally do the most of the work. Canoe-making is another branch that is confined to certain persons who have more skill than others in forming the model and in finishing the work. Although they do not seem to have regular trades in these manufactures, yet the most expert principally confine themselves to certain branches. Some are quite skilful in working iron and copper, others in carving or in painting, while others again are more expert in catching fish or killing whales."*

It is true, the conditions of existence of a northern tribe bordering on the Pacific coast cannot serve as a standard for the populations formerly inhabiting the valleys of the Mississippi and Ohio, or the Atlantic sea-board; yet, that the latter were led by similar motives, in regard to the division of labor, seems to be confirmed by the observations and extracts given in this sketch.

CONCLUSION.

In the preceding series of articles I have almost exclusively referred to *manufactures*, and among these, of course, only to such as could, from their nature, resist the destroying influence of time. Yet, it cannot be doubted that articles consisting of less durable materials, for instance, dressed skins, basket-work, mats, wooden ware, &c., formed objects of traffic. The most extensive exchange, perhaps, was carried on in provisions that could be preserved, such as dried or *buccaned* meat, maize, maple-sugar, and other animal or vegetable substances. Those who were abundantly provided with one or the other article of food bartered it to their less favored neighbors, who, in return, paid them in superfluous products or in manufactures of their own. Concerning the ways of communication, the North American continent afforded, by its many navigable waters, rivers as well as lakes, perhaps greater facilities for a primitive commerce than any other part of the earth, and the canoe was the means of conveyance for carrying on this commerce.

The learned Jesuit, Lafitau, has given some account of Indian trade as it was in the beginning of the eighteenth century, at which period he lived, as a missionary, in North America. "The savage nations," he says, "always trade among each other. Their commerce is, like that of the ancients, a simple exchange of wares against wares. They all have something particular which the others have not, and the traffic

*Swan, The Indians of Cape Flattery, at the Entrance to the Strait of Fuca, Washington Territory, Washington, 1870, p. 48.

makes these things circulate among them. Their wares are grain, porcelain (wampum), furs, robes, tobacco, mats, canoes, work made of moose or buffalo hair and of porcupine quills, cotton-beds, domestic utensils—in a word, all sorts of necessaries of life required by them."* A passage from Lawson, a contemporary of Lafitau, may also be inserted with propriety in this place. Speaking of the natives of Carolina, he says: "The women make baskets and mats to lie upon, and those that are not extraordinary hunters make bowls, dishes, and spoons of gum-wood and the tulip-tree; others, where they find a vein of white clay fit for their purpose, make tobacco-pipes, all which are often transported to other Indians that, perhaps, have greater plenty of deer and other game, &c."†

The arrival of the whites produced a thorough change in Indian life, wherever a contact between the two races took place. The age of stone and that of iron met, almost without an intervening link, for the so-called North American "copper period" was but of little practical significance. Simultaneously with the settlement of the eastern parts of North America by the whites, there arose a traffic between these and the Indians in their neighborhood, which provided the latter with implements and utensils so far superior to their own, that they soon ceased to manufacture and use them. The keen-edged steel axe superseded the clumsy and far less serviceable stone tomahawk; the European knife did away with the cutting implement of flint; and those of the natives who could not obtain fire-arms at least headed their arrows with points of iron or brass. The potter's art was neglected, solid and durable vessels of metal supplying the place of the fragile aboriginal fabrics of clay. Instead of procuring fire by turning a wooden stick, fitting in a small cavity of another piece of wood, rapidly between their hands until ignition was effected, the natives now resorted to the far preferable method of striking fire with steel and flint. Their dress, too, underwent changes, pliant woolen and cotton textures being employed to a certain extent instead of dressed skins. Formerly, when the Indians wished to make one of their more durable canoes or a large mortar for pounding maize, they had first to fell a suitable tree, a task which, on account of the insufficiency of their tools, required much labor and time. Being unable to cut down a tree with their stone axes, they resorted to fire, burning the tree around its foot and removing the charred portion with their stone implements. This was continued until the tree fell. Then they marked the length to be given to the object, and resumed at the proper place the process of burning and removing. In a similar manner the hollowing of the tree was effected. But now a few strokes of the European axe did the same work which formerly, perhaps, required days; and to a race as indolent and averse to labor as the Indians, the effect of that simple tool must have appeared almost miraculous.

* Lafitau, Mœurs des Sauvages Amériquains, Paris, 1724, Vol. II, p. 332.

† Lawson, History of Carolina, London, 1714; reprint, Raleigh, 1860, p. 330.

Greater, however, than these and many other advantages were the evils which the contact with the whites brought upon them; and in succumbing to the overwhelming power of the Caucasians, they shared the fate of every inferior race that takes up the contest with one occupying a higher rank in the family of men.

NORTH AMERICAN STONE IMPLEMENTS.

By Charles Rau.

The division of the European stone age into a period of chipped stone, and a succeeding one of ground or polished stone, or, into the palæolithic and neolithic periods, seems to be fully borne out by facts, and is likely to remain an uncontroverted basis for future investigation in Europe. In North America chipped as well as ground implements are abundant; yet they occur promiscuously, and thus far cannot be referred respectively to certain epochs in the development of the aborigines of the country. Archæological investigation in North America, however, is but of recent date, and a careful examination of our caves and drift-beds possibly may lead to results similar to those obtained in Europe. When in the latter part of the world man lived contemporaneously with the now extinct large pachydermatous and carnivorous animals, he used unground flint tools of rude workmanship, which were superseded in the later stages of the European stone age, comprising the neolithic period, by more finished articles of flint and other stone, many of which were brought into final shape by the processes of grinding and polishing. In North America stone implements likewise have been found associated with the osseous remains of extinct animals; yet these implements, it appears, differed in no wise from those in use among the aborigines at the period of their first intercourse with the whites.

In the year 1839, the late Dr. Albert C. Koch discovered in the bottom of the Bourbeuse River, in Gasconade County, Missouri, the remains of a *Mastodon giganteus* under very peculiar circumstances. The greater portion of the bones appeared more or less burned, and there was sufficient evidence that the fire had been kindled by human agency, and with the design of killing the huge creature, which had been found mired in the mud, and in an entirely helpless condition. The animal's fore and hind legs, untouched by the fire, were in a perpendicular position, with the toes attached to the feet, showing that the ground in which the animal had sunk, now a grayish-colored clay, was in a plastic condition when the occurrence took place. Those portions of the skeleton, however, which had been exposed above the surface of the clay, were partially consumed by the fire, and a layer of wood-ashes and charred bones, varying in thickness from two to six inches, indicated that the burning had been continued for some length of time. The fire appeared to have been most destructive around the head of the animal. Mingled with the ashes and bones was a large number of broken pieces

of rock, which evidently had been carried to the spot from the bank of the Bourbeuse River to be hurled at the animal. But the burning and hurling of stones, it seems, did not satisfy the assailants of the mastodon; for Dr. Koch found among the ashes, bones, and rocks *several stone arrow-heads, a spear-head, and some stone axes*, which were taken out in the presence of a number of witnesses, consisting of the people of the neighborhood, who had been attracted by the novelty of the excavation. The layer of ashes and bones was covered by strata of alluvial deposits, consisting of clay, sand, and soil, from eight to nine feet thick, which form the bottom of the Bourbeuse River in general.

About one year after this excavation, Dr. Koch found at another place, in Benton County, Missouri, in the bottom of the Pomme de Terre River, about ten miles above its junction with the Osage, *several stone arrow-heads* mingled with the bones of a nearly entire skeleton of the Missourium. The two arrow-heads found with the bones "were in such a position as to furnish evidence still more conclusive, perhaps, than in the other case, of their being of equal, if not older date, than the bones themselves; for, besides that they were found in a layer of vegetable mold which was covered by twenty feet in thickness of alternate layers of sand, clay, and gravel, one of the arrow-heads lay underneath the thigh-bone of the skeleton, the bone actually resting in contact upon it, so that it could not have been brought thither after the deposit of the bone; a fact which I was careful thoroughly to investigate."*

Fig. 1.

It affords me particular satisfaction to present in Fig. 1 a full-size drawing of the last-named arrow-head, which is still in the possession of Mrs. Elizabeth Koch, of Saint Louis, the widow of the discoverer. The drawing was made after a photograph, for which I am indebted to Mrs. Koch. It will be noticed that the point, one of the barbs, and a corner of the stem of this arrow-head—if it really was an arrow-head, and not the armature of a javelin or spear—are broken off; but there remains enough of it to make out its original shape, which is exactly that of similar weapons used by the aborigines in historical times. The specimen in question, which, as I presume, was found by Dr. Koch in its present mutilated shape, consists of a light-brown, somewhat mottled flint.†

*Koch, in Transactions of the Academy of Science of Saint Louis, vol. i, (1860,) p. 61, &c.

†I am well aware that the reality of Dr. Koch's discovery has been doubted by some, although it is difficult to perceive why he should have made those statements, if not true, at a time when the antiquity of man was not yet discussed, either in Europe or here, and he, therefore, could expect nothing but contradiction, public opinion being

In referring to these discoveries of Dr. Koch, and some other indications of the high antiquity of man in America, Sir John Lubbock concludes that "there does not as yet appear to be any satisfactory proof that man co-existed in America with the Mammoth and Mastodon."* Yet, it may be expected, almost with certainty, that the results of future investigations in North America will fully corroborate Dr. Koch's discoveries, and vindicate the truthfulness of his statements. Indeed, some facts have come to light during the late geological survey of Illinois, which confirm, in a general way, the conclusions arrived at by the above-named explorer. According to this survey, the blue clays at the base of the drift contain fragments of wood and trunks of trees, but no fossil remains of animals; but the brown clays above, underlying the Loess, contain remains of the Mammoth, the Mastodon, and the Peccary; and bones of the Mastodon were found in a bed of "local drift," near Alton, underlying the Loess *in situ* above, and also *in the same horizon, stone axes and flint spear-heads*, indicating the co-existence of the human race with the extinct mammalia of the Quaternary period.†

It must not be overlooked that both Dr. Koch and the Illinois survey mention flint arrow and spear-heads as well as stone axes as being associated, directly or indirectly, with the remains of extinct animals. These stone axes undoubtedly were *ground* implements; for, had they differed in any way from the ordinary Indian manufactures of the same class, the fact certainly would have been noticed by the observers. Thus far, then, we are not entitled to speak of a North American palæolithic and neolithic period. In the new world, therefore, the human contemporary of the Mastodon and the Mammoth, it would seem, was more advanced in the manufacture of stone weapons than his savage brother of the European drift period, a circumstance which favors the view that the extinct large mammalia ceased to exist at a later epoch in America than in Europe. The remarks of Lieutenant-Colonel C. H. Smith on this point are of interest. "Over a considerable part of the eastern side of the great (American) mountain ridge," he says, "more particularly where ancient lakes have been converted into morasses, or have been filled by alluvials, organic remains of above thirty species of mammals, of the same orders and genera, in some cases of the same species, (as in Europe,) have been discovered, demonstrating their ex-

totally unprepared for such revelations. Not being a scientific palæontologist, he certainly made some mistakes in putting together the bones of the animals exhumed by him; but these failings, in my opinion, have no bearing on his observations relative to the co-existence of man with extinct animals in North America. Only a short time ago some remarks tending to depreciate Dr. Koch's account were made by Dr. Schmidt, in an article on the antiquity of man in America, published in vol. v, of the *Archiv für Anthropologie*. I may state here that I was personally acquainted with Dr. Koch, whom I saw repeatedly at the meetings of the Academy of Science of Saint Louis.

*Prehistoric Times, 1st ed., p. 236.

†Geological Survey of Illinois, by A. H. Worthen, vol. i, (1866,) p. 38; quoted in Transactions of the Academy of Science of Saint Louis, vol. ii, (1868,) p. 567.

istence in a contemporary era with those of the old continent, and under similar circumstances. But their period of duration in the new world may have been prolonged to dates of a subsequent time, since the Pachyderms of the United States, as well as those of the Pampas of Brazil, are much more perfect: and, in many cases, possess characters ascribed to bones in a recent state. Alligators and crocodiles, moreover, continue to exist in latitudes where they endure a winter state of torpidity beneath ice, as an evidence that the great Saurians in that region have not yet entirely worked out their mission; whereas, on the old continent they had ceased to exist in high latitudes long before the extinction of the great Ungulata."*

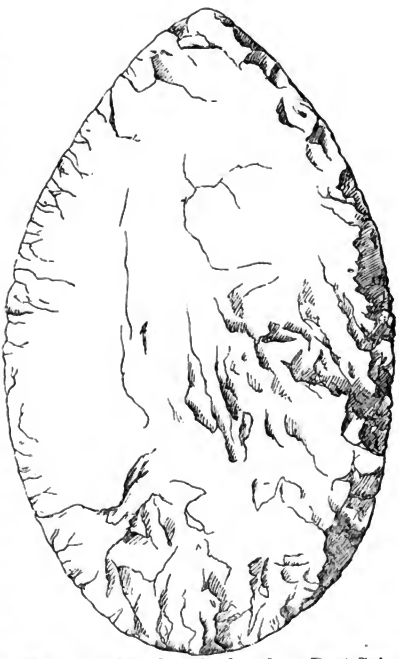
Flint implements of the European "drift type," however, are by no means scarce in North America, although they cannot (thus far) be referred to any particular period, but must be classed with the other chipped and ground implements in use among the North American aborigines during historical times.

In the first place I will mention certain leaf-shaped flint implements which have been found in mounds and on the surface, as well as in deposits below it. They are comparatively thin, of regular outline, and exhibit well-chipped edges all around the circumferences. On the whole, they are among the best North American flint articles which have fallen under my notice. The specimens found by Messrs. Squier and Davis in a mound of the inclosure called Mound City, on the Scioto River, some miles north of Chillicothe, Ohio, belong to this class. Most of them were broken, but a few were found entire, one of which is represented in half-size by Fig. 100 on page 211 of the "Ancient Monuments of the Mississippi Valley." This specimen measures four inches in length and about three inches across the broad rounded end. I have a still larger one, consisting of a reddish mottled flint, which was found on the surface in Jefferson County, Missouri. The annexed full-size drawing, Fig. 2, shows its outline. The edge on the right side is a little damaged by subsequent fractures, but for the sake of greater distinctness I have represented it as perfect. The finest leaf-shaped implements which I have had occasion to examine, are in the possession of Mr. M. Cowing, of Seneca Falls, New York. The owner told me he had more than a hundred of them, which were all derived from a locality in the State of New York, where they were accidentally discovered, forming a deposit under the surface. Mr. Cowing, who is constantly engaged in collecting and buying up Indian relics, refused to give me any information concerning the place and precise character of the deposit, basing his refusal on the ground that a few of these implements were still in the hands of individuals in the neighborhood, and that he would reveal nothing in relation to the deposit until he had obtained every specimen originally belonging to it. I am, therefore, unable to give any

* The Natural History of the Human Species, London, 1852, p. 89. The comparative freshness of the bones of extinct North American animals was noticed by Cuvier.

particulars, and must confine myself to the statement that the specimens shown to me present in general the outline of the original of Fig. 2, though they are a little smaller; and that they are thin, sharp-edged, and exquisitely wrought, and consist of a beautiful, variously-colored flint, which bears some resemblance to chalcedony.

Fig. 2.



Concerning the use or uses of North American leaf-shaped articles, I am hardly prepared to give a definite opinion, though I think it probable that they served for purposes of cutting. They were certainly not intended for spear-heads, their shape being ill-adapted for that end; nor do I think that they were used as scrapers, as other more massive implements of a kindred character probably were, of which I shall speak hereafter.

The aborigines were in the habit of burying articles of flint in the ground, and such deposits, sometimes quite large, have been discovered in many parts of the United States. These deposits consist of articles representing various types, among which I will mention the leaf-shaped implements in the possession of Mr. Cowing; the agricultural tools found at East Saint Louis, Illinois, of which I have given an account in the Smithsonian report for 1868; and the rude flint articles of an elongated oval shape, which were found about 1860 on the bank of the Mississippi, between Carondelet and Saint Louis, Missouri, and doubtless belonged to a deposit. I have described them in the above-named Smithsonian report, (p. 405,) and have also given there a drawing of one of the specimens in my possession. This drawing has been reproduced by Mr. E. T. Stevens, on page 441 of his valuable work entitled "Flint Chips," (London, 1870,) with remarks tending to show that the specimen does not represent an unfinished implement, as I am inclined to believe, but a

complete one. I must admit that my drawing is not a very good one. It gives the object a more definite character than it really possesses, the chipping appearing in the representation far less superficial than it is in the original, which, indeed, has such a shape that it could easily be reduced to a smaller size by blows aimed at its circumference. I have myself scaled off large flat flakes from similarly-shaped pieces of flint, using a small iron hammer and directing my blows against the edge, and have thus become convinced that the further working of objects like that in question could offer no serious difficulties to a practised flint-chipper. My collection, moreover, contains several smaller flint objects of similar shape, which are undoubtedly the rudiments of arrow and spear-heads, and I may add that I obtained a few from places where the manufacture of such weapons was carried on.

Yet the most important deposit of flint implements resembling certain types of the European drift, is that discovered by Messrs. Squier and Davis during their researches in Ohio. They have described this interesting find in the "Ancient Monuments of the Mississippi Valley," and a *résumé* of their account was given by me in the Smithsonian report for 1868, (p. 404.) The implements in question, I stated, occurred in one of the so-called sacrificial mounds of Clark's Work, on North Fork of Paint Creek, Ross County, Ohio. This flat, but very broad mound contained, instead of the hearth usually found in this class of earth-structures, an enormous number of flint discs, standing on their edges and arranged in two layers, one above the other, at the bottom of the mound. The whole extent of these layers has not been ascertained, but an excavation six feet long and four broad disclosed upward of six hundred of those discs, rudely blocked out of a superior kind of dark flint. I had occasion to examine the specimens from this mound, which were formerly in the collection of Dr. Davis, and have now in my collection a number that belonged to the same deposit. They are either roundish, oval, or heart-shaped, and of various sizes, but on an average six inches long, four inches wide, and from three-quarters to an inch in thickness. These flint discs are believed to have been buried as a religious offering, and the peculiar structure of the mound which inclosed them rather favors this opinion, while their enormous number, on the other hand, affords some probability to the view that they constituted a depot or magazine. Many of them are clumsy, and roughly chipped around their edges; and hence it has been suggested that they are no finished implements, but merely rudimentary forms, destined to receive more symmetry of outline by subsequent labor. Many of the discs under notice bear a striking resemblance to the flint "hatchets" discovered by Boucher de Perthes and Dr. Rigollot in the diluvial gravels of the valley of the Somme, in Northern France. The similarity in form, however, is the only analogy that can be claimed for the rude flint articles of both continents, considering that they occurred under totally different circumstances. The drift implements of Europe represent the most primitive attempts of man in the art of working stone, while the Ohio

discs, if finished at all, are certainly very rough samples of the handicraft of a race that constructed earthworks of astonishing regularity and magnitude, and was already highly skilled in the art of chipping flint into various shapes.

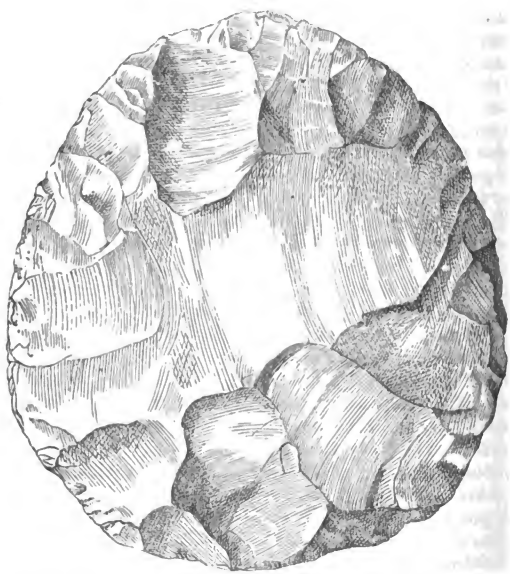
On page 214 of the "Ancient Monuments of the Mississippi Valley," a group of the flint articles from Clark's Work is represented. The drawing exhibits pretty correctly the irregular outline and general rudeness of these specimens; yet Mr. Stevens states (Flint Chips, p. 440) that "the representations are not at all satisfactory." The only fault, I think, that can be found with these drawings is their small scale, a fault which is very excusable, considering that at the period when Messrs. Squier and Davis published their work, (1848,) flint articles of such shape were no objects of particular attention; for just then the results of the researches of Boucher de Perthes were first laid before the scientific world, which, it is well known, ignored for a long time the significance of the rude flint tools discovered by the indefatigable and enthusiastic French savant in the diluvial gravel-beds of the Somme. It is true, however, that some of the flint discs of Clark's Work are wrought with more care than those represented in the "Ancient Monuments." This fact may be ascribed to a whim of the worker or workers, who gave some of the articles a greater degree of regularity by some additional blows. Mr. Stevens has only seen specimens of this better class, for such were those which Dr. Davis sold to the Blackmore Museum among his collection of Indian relics, and hence the author of "Flint Chips" seems to attribute to them a better general character than they really possess. I learn, however, that Mr. Blackmore, during a recent visit to Ohio, has succeeded in recovering a considerable number of the implements of Clark's Work, and thus an opportunity will be afforded again to investigate the true nature of these relics of a bygone people.

The objects in question consist of the compact silicious stone of "Flint Ridge," in Ohio, a locality described on page 214 of the "Ancient Monuments."* A careful comparison has established this fact beyond any doubt. The flint or hornstone which occurs in that region, is a beautiful material of a dark color, resembling somewhat the real flint found in nodules in the cretaceous formations of Europe. It is occasionally marked with darker or lighter concentric stripes or bands, the centre of which is formed by a small nucleus of blue chalcedony; and this internal structure appears particularly distinct in specimens which, by exposure, have undergone a superficial change of color. The stone, in general, possesses peculiarities by which it can be recognized at once, even when met in a wrought state far from its original site. According to Mr. Squier, arrow-heads made of this hornstone have been found in Kentucky, Indiana, Illinois, and Michigan. That they occur in Illinois, I can attest from personal experience.

* More particularly in Squier's "Aboriginal Monuments of New York," Buffalo, 1851, p. 126.

A few years ago, when treating of the flint implements of Clark's Work, I was not prepared to express a definite opinion concerning the manner in which they were used. In the mean time, however, I have obtained additional information in relation to the class of implements under notice, which enables me, as I think, to point out the purposes for which those of Clark's Work, as well as similar ones from other localities, were designed. In the summer of 1869, some children, who were amusing themselves near the barn on the farm of Oliver H. Mullen, in the neighborhood of Fayetteville, Saint Clair County, Illinois, dug into the ground and discovered a deposit of fifty-two disc-shaped flint implements, which lay closely heaped together. Several of them came into my possession through the assistance of Dr. Patrick, of Belleville, in the same county. They consist, like those of Clark's Work, of the peculiar stone of Flint Ridge. This I noticed at first sight, and so did Messrs. Squier and Davis, to whom I showed them. They resemble, in general shape, the

Fig. 3.



objects of Clark's Work, but are somewhat smaller and of perfectly symmetrical outline, having a well-chipped, though strong edge; in one word, they are highly finished implements, far superior to those of Clark's Work. In Fig. 3 I give a full-size drawing of one of my speci-

mens from Fayetteville, which is twenty millimeters thick in the middle. The slight irregularities observable in the circumference are owing to later accidental fractures. In this specimen, as in the others from the same find, the edge is produced by small, carefully-measured blows. The edges of my specimens from Fayetteville, moreover, exhibit traces of wear, being rubbed off to a small degree, and this circumstance, in connection with their shape, induces me to believe that they were used as *scraping* or *smoothing implements*. The aborigines, it is well known, hollowed their canoes and wooden mortars with the assistance of fire, and the implements just described, were, as I presume, employed for removing the charred portions of the wood. They are well adapted to the grasp of the hand, and, indeed, of the most convenient form and size to serve in that operation. Probably they were likewise used in cleaning hides, and for other purposes. The tools of Fayetteville, however, are much more handy than those of Clark's Work.

The fact that implements made of the hornstone of Flint Ridge are found in Illinois—a distance of about four hundred miles intervening—is of particular interest, as it shows that the material was quarried for exportation to remote parts of the country. It doubtless formed an article of traffic among the natives, like copper, sea-shells, and other natural productions which they applied to the exigencies of common life or used for personal adornment.

Concerning North American flint implements of the European drift type in general, Mr. Stevens expresses himself thus: "The legitimate conclusion at which we may at present arrive, is that implements, in form resembling some of the European palaeolithic types, were made by the aborigines of America at a comparatively late period, and that the people usually termed the 'mound-builders,' were, probably, the makers of these implements." (p. 443.)

There is no sufficient ground, I think, for attributing these implements exclusively to the mound-builders, considering that they occur on the surface, and in deposits below it, in regions where the people designated as the mound-builders are not supposed to have left their traces. In the States of New York and New Jersey, for instance, such articles repeatedly have been met. I will only refer to the leaf-shaped implements in possession of Mr. Cowing, which were found in New York, and are the finest specimens of that kind ever brought to my notice. That the people who erected the mounds made and used tools resembling the palaeolithic types of Europe, is proved by the occurrence of those tools in the mounds; but it follows by no means that they are to be considered as the sole makers of that class of implements. Supposing that the mound builders really were a people superior in their attainments to the aborigines found in possession of the country by the whites, it is certainly very difficult to draw a line of demarcation between the manufactures of the ancient and those of the more recent indigenous inhabitants of North America. The mound-builders—to preserve the adopted

term—certainly did not stow away all their articles of use and ornament in the mounds, but necessarily left a great many of them scattered over the surface, which became mingled with those of the succeeding occupants of the soil. Both the mound-builders and the later Indians lived in an age of stone, and as their wants were the same, they resorted to the same means to satisfy them. Their manufactures, therefore, must exhibit a considerable degree of similarity, and hence the great difficulty of separating them.

Yet Mr. Stevens goes in this respect farther than any one before him. He is particularly orthodox in the matter of pipes. Those who have paid some attention to the antiquities of North America, are aware of the fact that Messrs. Squier and Davis found in the mounds of Ohio, especially in one mound near Chillicothe, a number of stone pipes of peculiar shape, which they have described in the "Ancient Monuments of the Mississippi Valley." In these pipes the bowl rises from the middle of a flat and somewhat curved base, one side of which communicates by means of a narrow perforation, usually one-sixth of an inch (about four millimeters) in diameter, with the hollow of the bowl, and represents the tube, or rather the mouth-piece of the pipe, while the other unperforated end forms the handle by which the smoker held the implement and approached it to his mouth. In the more elaborate specimens the bowl is formed, in some instances, in imitation of the human head, but generally of the body of an animal—mammal, bird, or reptile. These pipes, then, were smoked either without any stem, which seems probable, or by means of a very diminutive tube of some kind, the narrow bore of the base not allowing the insertion of anything like a massive stem. The authors of the "Ancient Monuments" called these pipes "mound-pipes," merely to designate that particular class of smoking utensils; it was not their intention to convey the idea that the mound-builders had been unacquainted with pipes into which stems were inserted. On the contrary, they distinctly assign a beautiful pipe of the latter kind, representing the body of a bird with a human head* to the mound-builders, though this specimen was not found in a mound, but within an ancient inclosure twelve miles below the city of Chillicothe. Referring to this pipe, Mr. Stevens says: "Squier and Davis consider that this object is a relic of the mound-builders; but it does not appear that any pipe of similar form, or indeed *any* pipe intended to be smoked by means of an inserted stem, has been found in any of the Ohio mounds." Upon inquiry I learned from Dr. Davis that mounds had been leveled by the plough within the inclosure where the pipe in question was found, which, he is convinced, belonged to the original contents of one of those obliterated mounds. In the Smithsonian report for 1868, I published (on page 399) the drawing of a pipe then in possession of Dr. Davis. Its shape is that of a barrel somewhat narrowing at the bottom, and its material an almost transparent rock-crystal. The two hollows, one for

* Fig. 147 on p. 247 of the "Ancient Monuments;" Fig. 106 on p. 509 of "Flint Chips."

the reception of the smoking material, and the other for inserting a stem, meet under an obtuse angle. This pipe was taken from a mound near Bainbridge, Ross County, Ohio. Mr. Stevens suggests it had been associated with a secondary interment, (p. 524.) Dr. Davis, however, who is acquainted with the circumstances of its discovery, told me that it belonged, with various other objects, to the *primary* deposit of the mound. Thus it would seem that the mound-builders confined themselves by no means to the use of one particular class of pipes.

Those who advocate a strict classification of North American relics according to earlier or later periods, should bear in mind that mound-building was still in use—if not in Ohio, at least in other parts of the present United States—when the first Europeans arrived, though the practice seems to have been abandoned soon after the colonization of the country by the whites. Yet, even in comparatively modern times, isolated cases of mound-building have been recorded,* which fact would indicate, perhaps, a lingering inclination to perpetuate an ancient, almost forgotten custom. Many of the earthworks in the Southern States doubtless were built by the race of Indians inhabiting the country when the Spaniards under De Soto made a vain attempt to take possession of that vast territory, then comprised under the name of Florida. For this we have Garcilasso de la Vega's often-quoted statement relating to the earth-structures of the Indians. The Floridians, we also know, erected at the same period mounds to mark the resting-places of their defunct chieftains. Le Moyne de Morgues has left in the "Brevis Narratio" a representation and description of a funeral of this kind. When the mound was heaped up, the mourners stuck arrows in the ground around its base, and placed the drinking vessel of the deceased, made of a large sea-shell, on the apex of the pile.† But even without such historical testimony, the continuance of mound-building might be deduced from the fact that articles of European origin are met, though rarely, among the primary deposits of mounds. The following interesting communication, for which I am indebted to Colonel Charles C. Jones, will serve to illustrate one case of mound-burial that can be referred with certainty to a period posterior to the European occupation of the country:

"I have found in several mounds," says my informant, "glass beads and silver ornaments, and, in one instance, a part of a rifle-barrel, which were evidently buried with the dead. These, however, were secondary interments, the graves being upon the top, or sides, or near the base of the mound, and only a few feet deep. Never but in one case have I discovered any article of European manufacture interred with the dead in whose honor the mound was clearly erected. Upon opening a small earth-mound on the Georgia coast, a few miles below Savannah, I found a clay vessel, several flint arrow-heads, a hand-axe of stone, *and a por-*

* Squier, Aboriginal Monuments of New York, p. 112, &c.

† Le Moyne, in De Bry, vol. ii, Francoforti ad Moenum, 1591, pl. XL.

tion of an old-fashioned sword deposited with the decayed bones of the skeleton. This tumulus was conical in shape, about seven feet high, and possessed a base diameter of some twenty feet. It contained only one skeleton, and that lay, with the articles I have enumerated, at the bottom of the mound, and on a level with the plain. The oaken hilt, most of the guard, and about seven inches of the blade of the sword still remained. The rest of the blade had perished from rust. Strange to say, the oak had best resisted the 'gnawing tooth of time.' This mound had never been opened or in any way disturbed, except by the winds and rains of the changing seasons. I have no doubt but that the interment was primary, and that all the articles enumerated were deposited with the dead before this mound-tomb was heaped above him. This, within the range of my observation, is an interesting and exceptional case. I am persuaded that mound-building, at least upon the Georgia coast, was abandoned by the natives very shortly after their primal contact with the whites."

Fig. 4.

From mound-building I turn again to North American flint implements. Mr. Stevens refers in his work to the absence of flint scrapers in the series from the United States exhibited in the Blackmore Museum. Scrapers of the European spoon-shaped type, however, are not as scarce in the United States as Mr. Stevens seems to suppose. The collection of the Smithsonian Institution contains a number of them; and I found myself two characteristic specimens in the Kjökkenmödding at Keyport, New Jersey, described by me in the Smithsonian report for 1864. They lay upon the shell-covered ground, a short distance from each other, and were perhaps made by the same hand. In Fig. 4 I give a full-size drawing of one of my specimens, both of which consist of a brown kind of flint, such as probably would be called jasper by mineralogists. The figured specimen, it will be seen, possesses all the characteristics of a European scraper. Its lower surface is formed by a single curved fracture. The rounded head is somewhat turned toward the right, a feature likewise exhibited in the other specimen, which is a little larger, but not quite as typical as the original of Fig. 4. As the peculiar curve of the broad part is observable in both specimens, it must be considered as having been produced intentionally. Indeed, I have among my flint scrapers from the pilework at Robenhausen one which is curved in the same direction. In fashioning their implements in this particular manner, the Indian and the ancient lake-man possibly had the same object in view.

Fig. 5.

There is, however, another somewhat different class of North American flint articles, which, as I believe, were employed by the aborigines for scraping and smoothing wood, horn, and other materials in which they worked, or perhaps, also, in the preparation of skins. They resemble stemmed arrow-heads, which, instead of being pointed, terminate in a semi-lunar, regularly chipped edge. It is probable that they were partly made from arrow-heads which had lost their points. Schoolcraft gives in Fig. 3, of Plate 18, in the first volume of his large work, the drawing of an object of this class, calling it "the blunt arrow or *Beekwuk*, (Algonkin,) which was fired at a mark." It is likely enough that these articles served in part the purpose assigned to them by Mr. Schoolcraft. Yet, I have in my collection several in which the rounded edge is worn and polished, while the remaining part retains its original sharpness of fracture, a circumstance that can only be ascribed to continued use, and therefore leads me to believe that they were employed in the manner already indicated. These implements hardly could be used without handles. Fig. 5 represents, in natural size, one of my specimens, which was found on the surface near West Belleville, Saint Clair County, Illinois. The material is a yellowish-brown flint. The edge, it will be seen, is perfectly scraper-like. Inserted into a stout handle, this object would make an excellent scraper. The edge of this specimen is not polished, but it seems as if small particles of the edge had been scaled off by the pressure exerted in the use of the implement. In the original of the above full-size representation, Fig. 6, on the contrary, the curved edge is rubbed off to a considerable extent and perfectly polished, while the portion opposite the edge bears not the slightest trace of friction. This specimen, which consists of a whitish flint, was found in Saint Clair County, Illinois. In Fig. 7, lastly, I represent, in natural size, a fine large specimen, which I class among the implements under notice. I formerly supposed it to be a tool destined for cutting purposes, but the condition of the edge, which is rather blunt and hardly fit for cutting, afterward induced me to change my

Fig. 6.

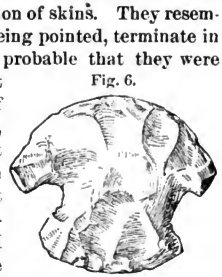


Fig. 7.

opinion. Originally, perhaps, one of those unusually large spear-heads, which are occasionally found, it may have been reduced subsequently, after having lost the point, to its present shape. Yet, it may never have possessed a form different from that which it now exhibits. This specimen is chipped from a fine reddish flint which contains encrinites. I obtained it from quarrymen near West Belleville, who found it in the earth while they were engaged in baring the rock for extending the quarry. In conclusion, I will state that, since writing the preceding pages, I received a number of stone implements from Muncy, Lycoming County, Pennsylvania, among which there are some large scrapers of the European type. Their material, however, is not flint, but either graywacke or a kind of tough slate.

THE PREHISTORIC ANTIQUITIES OF HUNGARY.

AN ADDRESS DELIVERED BY PROF. F. F. ROMER AT THE OPENING OF THE INTERNATIONAL ANTHROPOLOGICAL CONGRESS, HELD AT BUDAPEST, SEPTEMBER, 1876.

From the *Matériaux pour l'Histoire Primitive et Naturelle de l'Homme.*—Translated for the Smithsonian Institution by Charles Rau.

In addressing you for the purpose of considering the two allied sciences—anthropology and archæology—upon which the labors of this congress will be based, I can hardly overcome a feeling of embarrassment. You doubtless expect that, in my position as secretary-general, I should unroll before you a picture of what Hungary has done for those sciences, since most of you never have visited our country, nor have read the Hungarian works treating of them.

Here, as in Europe generally, it was almost considered a disgrace to pay attention to the barbarous nations, so far as their history before and after the great migrations is concerned. Only the study of the classical archæology of the Greeks and Romans was in vogue. Prior to the day when prehistoric archæology became a universal science, no one cared for the forms and decorations of the weapons, utensils, and trinkets of the so-called barbarous populations, but, in most cases, only for the precious materials of which they were made. The cemeteries and the tumuli, with their contents as simple and primitive as the men who used them, were, without any criticism, attributed to the great Roman people, even in parts of the country where the Romans never had been. The defensive works of prehistoric times, such as trenches, ramparts, and castles, were ascribed to them, and even on our geographical maps of that period one can see these works marked as Roman trenches, Roman fortifications, &c. In the catalogues of the National Museum, likewise, the arms, utensils, and ornaments of the barbarians have been assigned to the Romans.

Hungary has not had, like other countries, official archæologists appointed to attend to the preservation of the discovered objects. Only foreign savants, who in past centuries paid attention to such matters, have written on the antiquities of this country; and it must be stated that they spoke of them in a manner betokening the utmost simplicity of conception. Thus, they have affirmed in serious discourses held before academies, that gold grows naturally in the vineyards of Tokay, because there have been found in that locality objects made of gold wire, which presented no longer their original shape, having been altered and distorted by roots growing on the same spots. The bones of mammoths were at that time taken for those of giants, nummulites passed for grain, porous basalt for petrified bread, &c.

It is no matter of surprise, therefore, that during that period the

country people pa.d no attention whatever to the relics they constantly met almost everywhere, and sometimes in enormous quantities, while cultivating the ground. In plowing up our ancient cemeteries, repeatedly and at various depths, they have destroyed the funeral urns; but neither their fragments and contents nor the skeletons discovered in the more regular burying-places excited their curiosity or tempted them to closer examinations. When they found articles of bronze they sold them like old iron or applied them to their own use, after they had been transformed by the blacksmith according to their notions. How many objects have thus been lost which would have served to elucidate the condition of an unknown people that has passed away long ago!

Our predecessors only collected flint articles, which they broke into pieces of proper size to be used for striking fire. The stone axes or "thunderbolts," to which they attributed in their superstitious minds the virtue of curing various diseases of men and beasts, were likewise preserved by them, and the myths attached to these implements are here the same as in other parts of Europe. Wherever people speak of thunderbolts the superstitions to which they have given rise are so inveterate and general, and the belief in their supposed powers appears so firmly rooted, that no stronger proofs of their high antiquity could be adduced.

This is all I can say concerning the opinions which the objects pertaining to remote prehistoric ages have elicited among our compatriots, even in the present century!

What has been done within the last forty years, since the brothers Augustus and Francis de Kubinyi and my distinguished predecessor, Mr. John Erdy, commenced the study of our antiquities, was communicated by me to the congress at Paris in my sketch of the prehistoric times of Hungary, in which I have summed up from memory, and in a very succinct manner, all that relates to this epoch.* To this I have only very little to add at present.

Prior to the Universal Exposition at Paris, in 1867, several of our foreign colleagues had visited our archæological museum. They fully appreciated our articles of bronze and precious metals, which then almost exclusively constituted our prehistoric collections. The museums of the neighboring countries were not ahead of us in that respect, considering that the study of classical archæology prevailed everywhere at that period. Nothing was bought or exhibited but choice specimens of classical antiquity, or such as were made of precious metals, and their number sufficed to satisfy the interest of the curious.

The resources of the National Museum being very limited, most of the specimens were the gifts of good patriots, and they were deposited without order or system, occupying the places assigned to them by the generous donors.

A new era for these studies and for our collections dates from the in-

* See Compte-rendu de la IIe Session à Paris, p. 321, etc.

auguration of constitutional government in Hungary. The members of the diet, convinced that much was still needed to raise us to the level of the nations who had preceded us in the cultivation of prehistoric archæology, were judicious and patriotic enough to vote the sums requisite not only for the purchase of classical objects, for putting our collections in better order and cataloguing them, but also for the acquisition of specimens illustrative of prehistoric archæology and for explorations in the interest of that science.

It is very remarkable that the new development of the kingdom coincided with the Paris Exposition, where a retrospective section for the study of industries reaching back to the remotest times was, for the first time, added to the objects representing the achievements in modern art and ingenuity. It cannot be denied that the large number of specimens of stone, clay, bone, bronze, &c., exhibited on that occasion, excited the desire to collect analogous objects in our own country, and the labors of the International Anthropological Congress, then in session at Paris, served to strengthen this resolution. Thence arose new ideas and new plans for enlarging the scope of our National Museum. After the Universal Exhibition at Paris, the spacious hall, hitherto exclusively used for exhibiting the numismatic collection, was provided with glass cases, which already contain a remarkable collection; a large portion, however, embracing new acquisitions and interesting fragments had to be deposited in drawers. When this congress is over, the new additions, which are quite numerous, will be placed in an adjoining hall. They chiefly comprise objects of stone, the number of which increases very rapidly.

I had the pleasure of showing at the Paris congress the first obsidian nucleus obtained from Transylvania. Until then objects of obsidian were generally thought to be of Mexican origin, because none from other countries were known, excepting a few found in Italy. This discovery was followed by another. I found in the mineralogical cabinet of our museum a much larger nucleus, and later I was really surprised to discover in the museum of the college of Debreczin our largest obsidian nuclei, which had all been collected in the neighborhood of the celebrated mountain of Tokay, where obsidian occurs in considerable quantities. Farther east the objects and fragments of obsidian become more and more scarce. We are now able to prepare a map showing our obsidian finds, which are already numerous and increase from day to day. This map will be made more perfect after the congress, and will assist in engendering in our country a higher appreciation of all that our honored guests deem worthy of their attention. But our obsidian flakes are by no means equivalent to those of flint, so frequently met in the north and west of Europe; and without attempting to ascribe to them a too remote antiquity, we will simply state that they often occur associated with objects of bronze, as proved by the discoveries made by the counselor of mines, Mr. Henry Wolf, on the island of Bodrog

(Bodrogköz.) The conchoidal fracture of our obsidian is more curved than in the Mexican mineral; our knives are usually not so long and straight, our arrow-heads less elegant and regular than those made of transatlantic obsidian or of Danish flint. The occurrence of large nuclei, from which the last flakes suitable for knives have not been detached, may be owing to the fragility of obsidian implements, which induced the head of the tribe or the family to preserve these nuclei, in order to have the material for the fabrication of knives and arrow-heads always on hand.

The implements of which we have spoken were for a long time the only ones found in Hungary. It was a general belief that no chipped flints existed in our country, because none of them had anywhere been noticed. Yet this supposition arose solely from the ignorance of the value of the objects, and from the want of a word to specify them. Our peasants found them frequently and called them "fire-stones," (*pierres à feu.*) When this indicative word had been discovered, and, moreover, when specimens of chipped flint had been sent from Denmark to some of our friends of archæology, attention was aroused, and chipped flints, and even nuclei, were found in several counties. In a few years, I am confident, we shall be cognizant of their existence in all parts of the country where siliceous materials occur, and hence our museums may be gradually enriched with such specimens, just as our improvised exposition was increased by the knives from the extensive collection of Miss Torma. So great has been our progress in securing and interpreting objects of chipped flint, which were still very rare, and much sought for, some months ago.

At present a new field of studies opens before us, and we shall soon have to relinquish the erroneous, but widely diffused, idea that during the epochs when stone played everywhere such an important part, Hungary was not yet inhabited on account of being covered by the waters of the sea.

Up to this day we know only a few well-authenticated celts of polished flint. One of them was found in the county of Szabolcs, the others in that of Liptó; yet how many more will be discovered when we have learned to look for them, and when our peasants have been made acquainted with their value. As for other polished stone implements, we possess chiefly objects of serpentine, not only in considerable number, but also of very elegant appearance. This is sufficiently demonstrated by the old specimens of the National Museum, as well as by the late acquisitions of Baron Eugene Nyári, the Rev. Canon Francis Ebenhöch, the Rev. Vicar Stephen Mihályi, and by the material which our compatriots, who take pride in showing you their best and most interesting pieces, have put here on exhibition. Yet all these interesting objects were neither looked at nor preserved prior to the successful researches made throughout the kingdom.

You behold, however, only isolated specimens; for it was not feasible

to deprive the museums of their entire collections; and the private persons who were desirous of contributing their share in rendering the exposition more perfect had to abstain from sending all their objects, considering that the corridors of the National Museum, which alone were at our disposal, are already too narrow for a really complete exhibition representing the entire kingdom.

Objects of stag-horn and bone occur in prodigious number in some counties, more especially among the remains of repasts, and they are fashioned with a degree of skill which could only be acquired by long practice in the leisure hours of savage life. One may see, for instance, at Magyarad, at Szihalom, at Tószeg, at Szelevény, and at Csépa, objects of deer-horn and bone by the hundred and thousand, while articles of bronze and iron are but singly and sporadically met in these localities.

Our characteristic bronze articles are known throughout Europe: it has been sufficiently demonstrated that they are distinguished by peculiar forms. The numerous utensils; weapons, and ornaments of bronze bear witness that the Danubian countries had a civilization of their own, a fact becoming still more apparent by the quantity of the raw material and the number and size of the objects of copper. Is it necessary, gentlemen, to recall to your memory that these very articles of bronze and copper induced you at Stockholm to choose the capital of Hungary as the place of meeting for this year?

It is known that among semi-savage and warlike nations the nobility indulges in an excessive love of show. Their horsemen carry nearly all their treasure on their persons and horses, and hence they exhibit an extravagant taste in their offensive and defensive weapons, as well as in their armlets, fibulæ, necklaces, diadems, and horse-trappings, all of which are profusely embellished with spirals, with bells of different forms, with pendants presenting the shape of funnels, &c. Certain tubes, often overloaded with the ornaments peculiar to our districts, also should be mentioned.

In addition to the weapons and ornaments, there are utensils of copper and bronze, designed for digging the ground, for felling trees, and for cutting crops and brushwood. You will further see the metallic raw material, numerous fragments collected for being melted, ingots, molds, and unfinished objects, all of which are indicative of work performed *in loco*. Indeed, hearths for melting metals are not rare in our country.*

* During the fourth session of the congress, September 7, Mr. De Pulsky spoke of a *copper age*, which, he thinks, can be traced in Hungary. He believes that many implements in the National Museum, which are supposed to pertain to the age of bronze, consist in reality of copper. Nine of those instruments having been analyzed, it was found that they contain no trace of tin. Some consisted of pure copper, corresponding to the native copper of Hungary; others contained a little silver, like certain copper ores found in the same country. The implements in question most frequently resemble either the hatchets of woodcutters or the pickaxes still used by miners. These forms differ, according to Mr. De Pulsky, from the types characteristic of the bronze age, and

And as for fabrics of clay, are there anywhere found vases of this epoch which show more finish, more elaborate ornamentation and stranger shapes than those of ancient Pannonia? Or are there in other parts such quantities of those cones and pyramids of clay, hitherto considered as weights used in weaving? They probably also served as supports for cooking-vessels, considering that they are often blackened by smoke, and, moreover, have been met amid ashes and charcoal. Some of our vessels exhibit forms so singular and extraordinary that their application thus far has not been explained. The small vases and other diminutive objects in the rich collection of my friend, Baron Eugene Nyári, deserve our special attention, the more so since nearly all of them have been obtained from the same place, namely, his family estate at Pilin. Who can decide whether these miniatures constituted toys for children or were symbolic in character? Perhaps they represent on a small scale objects too costly to be abandoned forever.

The almost unique clay stamps, showing a variety of tasteful patterns,* and the small terra-cottas, representing animals, mostly sheep, oxen, and hogs, leave much room for speculation concerning their uses, especially when found with the remains of repasts.

Among the articles indubitably made in the country, we often meet products of the industry and art of remote regions, as, for instance, pearls from the Indian Ocean, beads of unwrought or polished amber from the Baltic Sea, and others of cut glass, which must have been derived from more civilized nations. These last-named relics betoken a commerce with the coasts of far-distant countries, and the character of their occurrence proves that they were family hoards brought together during a long lapse of time.

Those pagan monuments, the gigantic embankments and ditches disposed in two or even three parallel lines, which are met throughout the kingdom, inform us that it was once inhabited by warlike and quite numerous tribes, or by valiant proprietors who kept their large herds within immense and inaccessible inclosures. The power of these ancient

---

hence he concludes that an age of copper, forming the transition from polished stone to bronze, must be claimed for Hungary.

This view, however, was not shared by Mr. John Evans. He observed that among the two hundred objects thought to consist of copper, only nine or ten had been analyzed. Yet if they were all composed of copper, there would be no sufficient ground for establishing a copper age. If such an age had existed, its types would resemble more the forms of the stone age than those of the bronze period. The pierced copper implements of Hungary certainly bear an analogy to a certain class of drilled stone articles; but the latter, Mr. Evans thinks, are referable to the bronze age rather than to the times during which stone was exclusively used. He concludes that the Hungarian copper tools belong to the bronze age, but were made in moments when tin—a metal not found in Hungary—could not be obtained.—[*Translator.*]

* To judge from wood-engravings, kindly sent by Professor Romer, these relics resemble the stamps which the Mexicans used for impressing ornamental marks on their cotton cloth. They also employed stamps in decorating their vases before they were baked.—[*Translator.*]

people, and their association in secure places of habitation of great extent, can furthermore be inferred from the enormous tumuli which one sees scattered widely apart over the country, and which, for this reason, have been considered as lookouts for sentinels, or as hills upon which the Turkish viziers pitched their tents; for our people ascribe everything of a strange character to the Turks. Yet these mounds, so different in construction and character, stood originally by the side of villages or camps, amid large forests which no longer exist. Even in our time mounds are met in the primeval forests, from Bakony to Százhalom, near Bakonybél, at Tátika, and in other extensive timbered regions of our country.

Arriving at the period of iron, that which lies nearest to our own time, it must be confessed that our relics composed of that metal are less numerous than those of bronze and even of stone, although these latter belong to more remote times. This fact will not surprise you when you learn that until now objects of iron have been totally neglected. Being in most cases corroded by rust and broken, and resembling, moreover, very often the implements of the present time, they were generally undervalued, not only by the common people, but also by the more instructed, who chiefly prize objects composed of precious metals, especially when they are well preserved and present elegant and extraordinary forms. Thus it has been until now; but in future these underrated relics, which are of such importance in their bearing on archæological questions, will be carefully collected and preserved.

This is all we can say in reference to our progress in archæological studies.

As for *anthropology*, it must be confessed that this science has not been cultivated among us to the extent it deserves. We have not yet a noticeable collection, and those of our savants who pursue that study must exert themselves, in order to keep pace with the anthropologists of other countries. We expect much, however, from the intimate intercourse that will spring up during this congress.

In general we may state, without self-praise, that for several years the interest of our countrymen has been increasing. Archæological publications are dispersed throughout our literature; museums multiply in the counties in a manner highly satisfactory to the friends of our science. I find everywhere *collectors* of antiquities, and the taste for original research is growing, as can be inferred from our improvised exposition. Thus we are entitled to the hope that henceforward our compatriots will preserve what they find, and that we shall soon possess all the material required for our studies.

It is true, we have no megalithic monuments; we cannot show you kitchen-middens or lacustrine habitations. They are either wanting in our country, or, if they exist, have not yet been discovered. On the other hand, we can place before you all that has come to light in our country within these last years. The liberality of our museums and the

noble patriotism of our colleagues enable me, I am happy to state, to fulfill the promise given you at Stockholm, namely, to gather in our National Museum all or nearly all objects scattered over Hungary that might serve to facilitate the study of our bronze age, the most interesting task before us. What I promised two years ago is now an accomplished fact. It is left to you, honored colleagues, to discuss the important question to what people or peoples we are indebted for the objects which characterize so strikingly the development of our country.

I have prepared a table indicating the number of relics and the materials composing them. Our exposition embraces nearly 31,500 objects, of which 22,000 belong to the museums and private persons of this country, and 9,000 to the National Museum.

This total comprises—

Objects of ordinary stone, flint, and obsidian	9,400
Objects of polished stone	2,800
Objects of stag-horn	560
Objects of bone	1,600
Objects of clay	3,300
Objects of copper	190
Objects of bronze	7,630
Weapons	1,170
Trinkets and objects of gold and silver	1,800

From the composition of this table, and its incompleteness, it may be inferred that there are yet great gaps, and that the necessary minuteness is still wanting. Finally we shall obtain definite results, and the science will be cultivated among us as in other countries of Europe. In fact, we have had no time for preparing ourselves as thoroughly as we might have wished. Most of the works of our compatriots, written in the Hungarian language, arrived so late that it was not possible to translate them in time to be submitted to the congress; but as you doubtless desire to acquaint yourselves with the character of the studies pursued in our country relative to its antiquities, and as our own interest imposes upon us the duty of giving you full information, we shall present a complete *résumé* in our forthcoming report, which will reflect our labors like a true mirror.

THE STOCK-IN-TRADE OF AN ABORIGINAL LAPIDARY.

(Mississippi.)

By Charles Rau.

In an essay entitled "Ancient Aboriginal Trade in North America," which was published in the Smithsonian Report for the year 1872, I attempted to trace the beginning of a division of labor among the former inhabitants of this country. I expressed the opinion that certain individuals, who were, by inclination or practice, particularly qualified for a distinct kind of manual labor, devoted themselves principally or entirely to that labor, basing my conjecture on the occurrence of manufactured articles of homogeneous character in mounds or in deposits below the surface of the soil. There is little doubt, for instance, that there were persons who devoted their time chiefly to the manufacture of stone arrow-heads and of other articles produced by chipping, among which may be mentioned those remarkable large digging tools

described by me several years ago,* and the oval or leaf-shaped implements made of the peculiar hornstone of "Flint Ridge," in Ohio. These latter, which bear much resemblance to certain palæolithic types of Europe, were first noticed by Mr. E. G. Squier, who found, many years ago, a large deposit of them in a low mound of "Clark's Work," in Ross County, Ohio. An excavation, six feet long and four feet wide, disclosed about six hundred specimens, which were standing edgewise, forming two layers, one immediately above the other. The deposit extended beyond the limits of the excavation on every side, and hence the actual number of specimens has not become known.† Since that time deposits composed of objects of corresponding shapes and of the same material have been discovered, generally under the ground, in Illinois, Wisconsin, and Kentucky; but the area of their distribution may be much greater. Dr. J. F. Snyder has described the Illinois deposits in the Smithsonian Report for 1876.‡ That of Beardstown, in Cass County, is of special interest. It contained about fifteen hundred leaf-shaped or round implements, arranged in five horizontal layers, which were separated by thin strata of clay. According to Dr. Snyder, another deposit, said to have consisted of three thousand five hundred specimens, was discovered in Fredericksville, Schuyler County, in the same State. Smaller subterranean deposits of flint arrow-heads, cutters, &c., have been met with in various States in the eastern half of this continent, the articles showing in many cases no traces of use whatever, and generally exhibiting a symmetrical order in their arrangement. Such facts naturally lead to the supposition that flint-chipping formed a special profession, and, furthermore, that the objects found in these hiding-places, or "caches", constituted the magazines of the aboriginal craftsmen. The deposit of Clark's Work, it should be stated, has been thought to owe its occurrence in a mound of peculiar structure to superstitious or religious motives, and thus to partake of a sacrificial character. This view, however, whether correct or not, has no bearing on the point in question, namely, the production of the chipped articles by way of trade.

The carved stone pipes, representing imitations of the human head, of quadrupeds, birds, &c., which were found in great number by Messrs. Squier and Davis in a mound of the group called "Mound City," not far from Chillicothe, Ohio, illustrate the highest development of early aboriginal art in this country.§ Their production required much skill and patient endurance, and hence we may infer that the manufacture of stone pipes formed in past times a branch of industry which was chiefly carried on by persons who possessed an extraordinary talent for this

* A Deposit of Agricultural Flint Implements in Southern Illinois, Smithsonian Report for 1868, p. 401.

† Squier and Davis: Ancient Monuments of the Mississippi Valley, Washington, 1848, p. 158; representations of the objects on p. 214.

‡ Deposits of Flint Implements, p. 433.

§ Ancient Monuments, &c., p. 242, &c.

peculiar kind of work. There are to this day pipe-makers among the Ojibway Indians, and probably among other tribes.

In corroboration of the foregoing, I may state that certain handicrafts were practised to some extent by the North American Indians at the time of their first intercourse with the whites. "They have some," says Roger Williams, "who follow onely making of Bowes, some Arrowes, some Dishes (and the women make all their Earthen Vessells), some follow fishing, some hunting: most on the Sea side make Money, and Store up shells in Summer against Winter whereof to make their money."* These remarks, of course, relate to the New England tribes, with whom Roger Williams used to associate; but a later writer, Lawson, gives a similar account of the Southern Indians, among whom labor was doubtless still more systematized, considering that they had attained a somewhat higher degree of civilization than their Northern kinsmen. It is known that until within late years the manufacture of arrow-heads was practised as a profession by certain individuals among several Indian tribes.

I will now proceed to describe a deposit of aboriginal manufactures, which illustrates the subject of division of labor among the earlier inhabitants of this country better than any other discovery of kindred character with which I have become acquainted.

In the spring of 1876, Mr. T. J. R. Keenan, of Brookhaven, Lincoln County, Mississippi, presented to the National Museum a collection of jasper ornaments, mostly unfinished, which had been found in Lawrence County, in the same State, forming a deposit of a very remarkable character. Being desirous of learning the particulars of this discovery, I addressed a letter to Mr. Keenan, and obtained from him the desired information. The deposit was accidentally discovered on the farm of Anthony Hutchins, situated on the east side of Silver Creek, about one mile distant from Hebron church, in the northeastern part of the above-named county. While Mr. Huchins's son was engaged one day in July, 1875, in ploughing a cotton-field, entirely free from pebbles and stones of any kind, a grating of the ploughshare attracted his attention, and upon examination he found that he had struck the deposit, which appeared originally to have been buried two feet and a half below the surface, filling an excavation of about eighteen inches in diameter. The arrangement of the articles constituting this deposit will be described hereafter. They all consist of jasper of a red or reddish color, which is sometimes variegated with spots or streaks of a pale yellow. But few of these objects, which were undoubtedly designed for ornament, may be considered as entirely finished.

The following is an inventory of the specimens sent to the National Museum by Mr. Keenan:

1. Twenty-two pebbles of jasper, showing no work whatever. They are irregular in shape and mostly small, being from half an inch to an inch and one-fourth in size.

* A Key into the Language of America (London, 1643); Providence, 1827; p. 133.

2. Twelve rudimentary ornaments of different forms, brought into shape by chipping.

3. Three polished pieces with narrow grooves, showing that cutting was also resorted to in the manufacture of the objects.

4. Two hundred and ninety-five beads of more or less elongated cylindrical shape, measuring from one-fourth of an inch to three inches in length, and from one-fourth of an inch to one inch in thickness. Though they are polished, they exhibit but rarely a perfectly regular cylinder form. Ten of them show the beginnings of holes, in most cases at one end.

5. One hundred and one round beads of a more compressed or discoidal shape. They are from one-eighth to five-eighths of an inch long, while their diameters vary from one-fourth to three-fourths of an inch. They are polished, and only five of the number exhibit incipient holes.

6. Nine polished ornaments of elongated flattish shape, showing an expansion on each side (like Fig. 10). They measure from an inch and one-fourth to two inches and one-fourth in length, and from three-fourths of an inch to an inch and one-fourth in width across the middle. One specimen is partly drilled.

7. Two specimens of similar character, but expanding on one side only (Fig. 11). They are from an inch and a half to two inches in length and seven-eighths of an inch wide across the middle.

8. One large ornament showing two expansions on each side (Fig. 12). A more minute description will follow.

9. Two small animal-shaped objects. They are about an inch long and well polished.

10. Two semicircular polished pieces, probably designed to be worked into the shapes of animals.

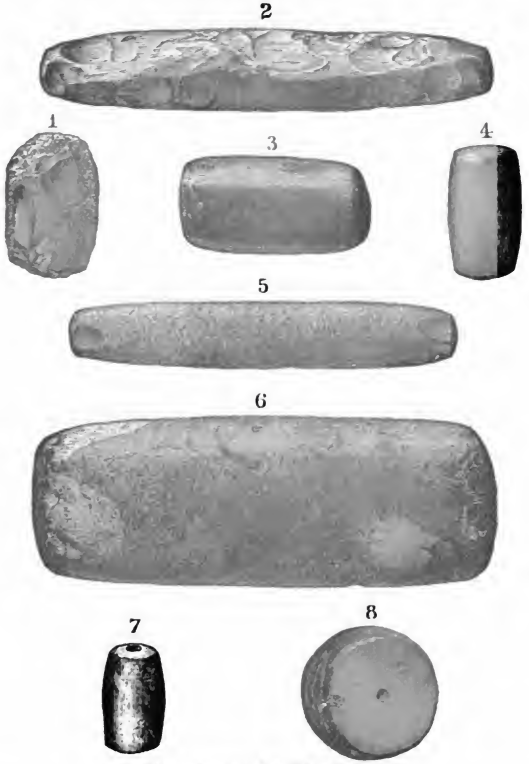
There are four hundred and forty-nine pieces in all. Mr. Keenan has kept for himself sixteen specimens, and four had been disposed of before he became the owner of the collection. One of the latter was drilled entirely through. Hence the entire deposit consisted of four hundred and sixty-nine objects.

From the character of the inventory just given several inferences may be drawn.

There can hardly be any doubt that the deposit constituted the stock-in-trade of some aboriginal manufacturer of ornaments of jasper, which he made from pebbles of that material.* He shaped them by the operation of chipping before he proceeded to grinding, and he likewise applied the method of cutting in the manufacture of the articles. The cutting, however, was done after the piece had been reduced to a certain shape by grinding. The drilling of the beads and bead-like ornaments was the final process in their fabrication. This fact affords an additional

*According to Mr. Keenan's express statement, no jasper pebbles occur in the neighborhood of the place where the ornaments were entombed. They must have been brought from a distance.

proof that in this country stone objects requiring perforations were brought into perfect shape before the drilling was commenced. The same rule prevailed in Europe, as every one knows who has studied the stone antiquities of that part of the world.



Jasper ornaments from Mississippi (½).

The accompanying illustrations represent, in full size, typical specimens of the different classes of wrought articles composing the deposit.

Fig. 1.—A jasper pebble, chipped into the form of a cylindrical bead. The smooth surface of the pebble has not entirely disappeared.

Fig. 2.—A long, comparatively slender piece, designed for a bead. It shows the chipping very distinctly, though the sharp edges have been removed by grinding.

Fig. 3.—Polished cylindrical* bead (undrilled).

Fig. 4.—Very regular and well polished cylindrical bead of a fine red color (undrilled).

Fig. 5.—Long and slender bead, apparently not entirely ground into shape (undrilled).

Fig. 6.—Large cylindrical bead, which exhibits a rather rough surface, the traces of chipping not having been entirely removed by the grinding process (undrilled).

Fig. 7.—Small cylindrical bead, polished, but not regular in shape, and showing at one end the beginning of a hole, which forms a cylindrical cavity nearly three millimeters in diameter and two millimeters in depth.

Fig. 8.—Polished bead of discoidal shape, with incipient holes at both ends. One of the holes is merely indicated by a small depression; the other forms a cup-like cavity of two and a half millimeters diameter and two millimeters depth.

Fig. 9.—Ornament of elongated flattish shape, with an expansion on each side. It is unfinished, having been brought into shape by chipping alone.

Fig. 10.—Object of the same form; well polished, but not absolutely regular in outline. There can be no doubt that the ornaments of this description were intended to be drilled in the direction of the longitudinal axis. A broken specimen of the collection shows the commencements of holes at both extremities.

Fig. 11.—Polished ornament of similar character, exhibiting an expansion or projection only on one side (undrilled).

Fig. 12.—Large polished ornament of elongated flattish form, with two expansions on each side. The object is irregular in outline, the expansions being larger at one extremity than at the other. It is three-fourths of an inch thick in the middle. A longitudinal perforation was doubtless intended.

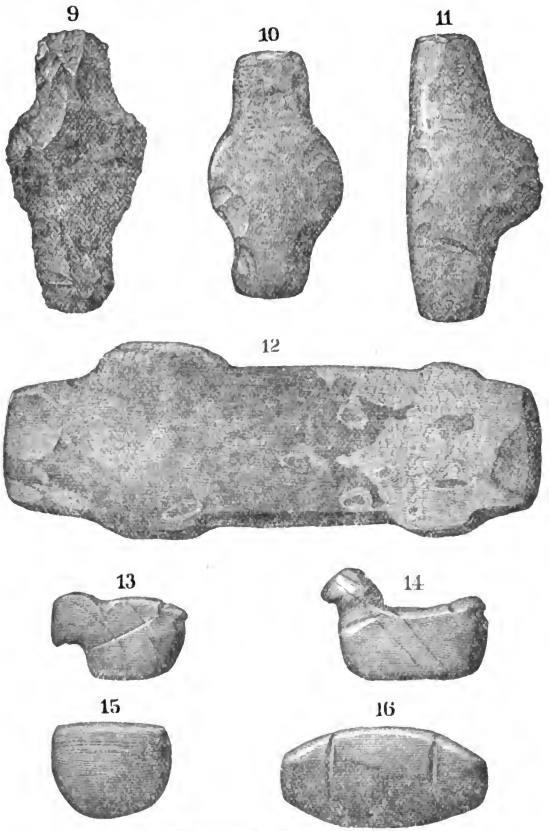
Fig. 13.—A small, flattish, bird-shaped object, made of beautiful cherry-red jasper, and well polished. The wings are indicated on both sides by slight grooves.

Fig. 14.—A similar polished object of dark-red jasper, in which the bird form is less distinctly expressed. Indeed, the maker may have purposed to represent some quadruped. It would be unprofitable to speculate on the use of these two carvings. They probably were merely toys, though it is not impossible that they had a totemic significance, or were designed to serve as charms. They could not well be worn about the person, and I doubt whether it was intended to perforate them.

Fig. 15.—A polished semicircular piece, perhaps designed to be worked into the shape of a bird; its size is exactly the same as that of the original of Fig. 13.

* In this description of ornaments the term "cylindrical" must not be taken in a mathematical sense, as I merely intend to indicate by it an approximate resemblance to a cylinder.

Fig. 16.—A polished piece, of a compressed oval shape, showing two parallel incisions in the direction of the minor axis. They were evidently made with a sharp flint tool. It is probable that this specimen illustrates a stage in the manufacture of a small animal-shaped trinket, like those already described, the piece being almost too flat to be made into a bead of cylindrical form.



Jasper ornaments from Mississippi (½).

It now remains to be stated in what manner the objects forming the deposit were arranged. The large piece, represented by Fig. 12, lay flat on the bottom of the hole; the long and massive cylindrical beads were

placed on end, on and around it, as closely as possible, and the smaller objects were spread over them in a rather promiscuous way.

The owner of the articles here described, we may suppose, had no intention of leaving them buried in the ground; he would some day have recovered them, had circumstances permitted. Death, captivity, or removal to another part of the country, from which he never returned, may have frustrated his design. The deposit in question shared the fate of many others which have been preserved to our time, in order to add, as it were, to our knowledge of the former occupants of this country.

It would be a vain endeavor to offer any conjecture as to the age of the deposit. The objects appear absolutely fresh, not showing the slightest alteration of the surface. Jasper, however, is a very hard substance, capable of resisting the influences of exposure for ages. On the other hand, there is nothing that would militate against a comparatively recent, though pre-Columbian, origin of the deposit.

It must have been a very difficult task to work a stone as hard as jasper without the proper appliances, and we cannot but admire the skill, and, above all, the patience of the artist or artists who fashioned the ornaments from such an obdurate material. Yet it is known that even at the present time mineral substances of equal hardness are shaped and perforated in the most primitive manner by tribes occupying a very low position in other respects. The execution of such work is but a trial of endurance, a quality displayed in an eminent degree by uncivilized man when his mind is bent upon a definite purpose.

OBSERVATIONS ON A GOLD ORNAMENT FROM A MOUND IN FLORIDA.

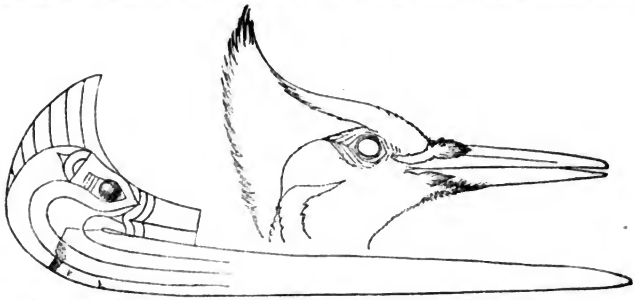
By Charles Rau.

In December, 1877, Mr. Damon Greenleaf, of Jacksonville, Florida, sent for examination to the National Museum a curious relic of gold, lately discovered in a mound in Manatee County, Southern Florida, with a request for information as to its probable origin and use.

The accompanying illustration represents the object in question reduced to one-half of its natural size, the original measuring exactly nine inches from the point to the middle of the opposite curve. It is cut from a flat piece of gold plate, not quite a millimeter in thickness, and somewhat thinner toward the edge. The specimen is broken in two pieces, as indicated by the dotted line in the figure; but the two parts fit well together, and thus the original character of the object remains unaltered. On the whole, it is in a good state of preservation, though the effects of long exposure are plainly visible. Both faces appear bright and smooth, and the engraved lines, which represent exactly the same pattern on both sides, seem to be as fresh as on the day when they were traced.

Little need be said concerning the shape of the ornament, considering that all its features are distinctly expressed in the cut. The maker

evidently intended to represent a bird's head, the neck of which forms a blade-like prolongation, and the grotesque execution clearly illustrates



Gold ornament from a mound in Florida, and head of the ivory-billed woodpecker. (½).

the curious taste characterizing the ornamental work of the North American Indian. It never would occur to a person of Caucasian origin to represent a bird's head in the peculiar manner here exhibited. The eye of the bird, it should be stated, has been formed with great regularity by the process of punching from the under side, and perfectly resembles in size and convexity the head of a common brass tack. However clumsy the design of the object may appear to a common observer, the ornithologists of the National Museum have discovered the prototype that was before the aboriginal artist's mind. The truncated bill and recurved crest leave no doubt that he intended to represent the ivory-billed woodpecker (*Picus principalis*, Linn.; *Campephilus principalis*, Gray), a bird quite frequent in Southern Florida, but not found at any great distance from the Gulf of Mexico. To facilitate comparison, a half-size sketch of the head of the ivory-billed woodpecker is placed in juxtaposition with the cut representing the aboriginal relic.

The composition of the gold plate from which the specimen is made indicates its post-Columbian origin. Having been forwarded, through the courtesy of Mr. E. B. Elliott, chief clerk of the Bureau of Statistics, to the Mint at Philadelphia, for the purpose of ascertaining its weight and composition or fineness, it was found to weigh 1.53 ounces (troy), and to consist exclusively of gold and silver, in the proportion of 893 parts of gold to 107 parts of silver. Consequently, the amount of gold therein contained is 1.366 ounces, and of silver 0.164 ounce (troy). The metal value of the relic is twenty-eight dollars and forty-five cents. According to Mr. Elliott's statement, its composition corresponds almost exactly with that of the "ounce" of gold or quadruple of Spain bearing the date of 1772; and this circumstance is not without significance, in so far as it seems to point to the source from which the material of the figure was derived. It may have been given by Spaniards to some

Indian, who fashioned it, according to his taste, to serve as a totemic emblem or ornament, perhaps designed to form a part of the head-dress; for, though a small elongated aperture is formed by the inner curve of the bird's neck, I hardly deem it likely that the object was intended for suspension. The Florida Indians, it is well known, paid particular attention to the decoration of their heads, and hence it is not an improbable conjecture that it once embellished the crown of some chief or brave while living, and was afterward placed in his grave, in accordance with aboriginal custom.

Whether the figure was brought into shape by hammering a large gold coin or a bar of gold, or was made from a piece of sheet gold, cannot now be decided. The surfaces certainly look as though they had undergone the process of beating; but it is just as likely that the ornament was made from a piece of gold plate furnished by whites. That the Indians were skillful in working metal in a cold state is shown by the implements and ornaments of copper found in various parts of the United States, more especially in the neighborhood of Lake Superior, where their supplies of native copper were chiefly obtained. Even modern Indians practise the art of working silver dollars, beating and cutting them into tasteful gorgets, ear-rings, and other objects of personal adornment. On the other hand, there is no ground whatever for supposing that the Indians north of Mexico possessed the skill of casting gold, and far less of producing an alloy like that of which the Florida ornament is composed.

While I am of opinion that the material of the relic was obtained from whites, I ascribe (as stated) the work itself—that is, the cutting out of the figure and the tracing of the lines—to the agency of an aboriginal artist. The ornamental lines, though incised with a steady hand, are not uniform in width, and in some places the tracing forms a double line, as though the implement used in lieu of a graver had not been provided with a sharp point. A knife which has lost its extreme point would produce such lines; perhaps also a pointed flint. The latter alternative, however, is hardly admissible, considering that at the time when the object was made, implements of such primitive character probably had been superseded by more efficient instruments of iron or steel. The North American Indians, like other savages, were not slow in recognizing the superiority of the white man's tools, and adopted them without hesitation.

Though it would be hazardous to pronounce a definite opinion concerning the age of the relic, it may be assumed that it is not very old. Its origin may not date back more than a century. It was perhaps made during the second period of Spanish supremacy in Florida, which lasted from 1780 to 1821, when the province was ceded to the United States. The ornament was taken *from the centre* of the mound, and doubtless formed a part of a primary burial. This fact affords an additional evidence that mound-building was continued in this country after

its occupation by Europeans. "The man who dug it out," says Mr. Greenleaf, "had no idea that it was gold. He had been digging all day, and was just giving up the work, when, with a final desperate blow, he struck, broke, and brought to light the gold ornament. He then explored the rest of the mound carefully, but found nothing but fragments of pottery and crumbling bones."

Purely aboriginal relics of gold appear to be extremely rare in this country. According to Colonel Charles C. Jones, Indian beads composed of that metal have been met with in Georgia. He says: "Gold beads—evidently not European in their manufacture—have been found in the Etowah Valley, in the vicinity of the large mounds on Colonel Tumlin's plantation."* This statement is corroborated by Mr. M. F. Stephenson in an article on ancient mounds in Georgia, which was published in the Smithsonian Report for 1870. I am not aware that Indian relics of gold have been found in Florida in modern times; but mention is made of a small gold bell obtained in 1527 by the party of the unfortunate Pamphilo de Narvaez, immediately after his landing in Florida. It was discovered in one of the large houses (*buhios*), which the natives had deserted upon the approach of the Spaniards.†

We learn from the old accounts relating to the discovery and colonization of the large tract of land formerly called Florida that the aboriginal inhabitants were cognizant of the occurrence of gold in their districts. The grains of gold which the early Spanish visitors saw in the possession of the Floridians excited their cupidity, and inspired them with the hope of finding a second Mexico or Peru in the more northern portion of the new continent. Upon asking the Indians where the precious metal had been obtained, they were referred to the "Apalatcy" Mountains, in the north, from which rivers carrying particles of gold, silver, and copper were flowing. The Indian method of collecting these metallic grains is represented on plate 41, vol. ii, of De Bry's *Peregrinationes* (Frankfort on the Main, 1591), where the natives are pictured as using long tubes for this purpose. Jacques Le Moyne de Morgues, the artist of Laudonnière's expedition, to which the volume relates, probably drew the sketch from imagination, or according to what he had heard from the Indians, who were never noted for their veracity. The short Latin description accompanying the sketch closes with the statement that the Spaniards knew how to apply these treasures to their own use. Indeed, traces of mining operations which are ascribed to the Spaniards have been found in the gold district of Georgia. It would be foreign to my purpose to enlarge on this subject; but I will refer to two articles by Dr. D. G. Brinton, which treat of this early

* Antiquities of the Southern Indians. New York, 1873, p. 48.

† "Un de ces buhios était si grand, qu'il pouvait contenir plus de trois cents personnes: les autres étaient moins vastes; nous y trouvâmes une clochette en or parmi des filets."—*Relation et Naufrages d'Alvar Nuñez Cabeça de Vaca.* Paris, 1837, p. 24. (Ternaux-Compans Collection.) The Spanish original was published in the year 1555 at Valladolid.

mining: one forms the third appendix to his excellent little work entitled *Notes on the Floridian Peninsula;* the other is published in the *Historical Magazine,* vol. x (1866), p. 137, under the title "Early Spanish Mining in Northern Georgia." Additional information on the subject is to be found in Colonel Jones's work to which I have referred on the preceding page.